PEPWAVE

Broadband Possibilities

Pepwave AP One Series:

AP One/ AP One 300M / AP One mini / AP One X

Pepwave AP Pro Series:

AP Pro X

Pepwave Flex AP Series

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Table of Contents

1 Introduction and Scope 4
2 Product Features and Benefits 5
3 Package Contents 6
3.1 AP One 6
3.2 AP One 300M 6
3.3 AP One mini 6
3.4 AP One X 6
3.5 AP Pro X 7
3.6 Flex AP 7
4 Hardware Overview 8
4.1 AP One 8
4.2 AP One 300M 9
4.3 AP One mini 10
4.4 AP One X 11
4.5 AP Pro X 12
4.6 Flex AP 13
5 Installation 15
5.1 Installation Procedures 16
6 Information 17
6.1 System 18
6.2 Wireless 19
7 Configuration 25
7.1 System 26
7.2 LAN 30
7.3 Wireless Networks 33
7.4 Advanced Wireless Settings 49
7.5 WDS 53
7.6 SpeedFusion™ 54
7.7 SNMP 58
7.8 Web Administration 61

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8 Tools - Diagnostic Tools 63
9 Commands 64
9.1 Activate Changes 65
9.2 Firmware 66
9.3 Configuration 67
9.4 Misc 68
10 Real Time Status 69
11 Peplink Balance AP Controller 70
12 Restoring Factory Defaults 71
12.1 AP One 71
12.2 AP One 300M 71
12.3AP One Mini 72
12.4 AP One X 72
12.5 AP Pro X 72
12.6 Flex AP 72
13 Appendix 73

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1 Introduction and Scope

Pepwave's AP Series of enterprise-grade 802.11b/g/n Wi-Fi access points is engineered to provide fast, dependable, and flexible operation in a variety of environments, all controlled by an easy-to-use centralized management system. From the small but powerful AP One mini to the top-of-the-line AP Pro X, the Pepwave AP Series offers wireless networking solutions to suit any business need, and every Pepwave access point is loaded with essential features such as multiple SSIDs, VLAN, WDS, and Guest Protect.

A single Pepwave access point can masquerade as up to four virtual access points, each with its own security policy (WPA, WPA2, etc.) and authentication mechanism (802.1x, open, captive portal, etc.), allowing faster, easier, and more cost-effective network builds. Each member of the Pepwave AP Series family also features a high-powered Wi-Fi transmitter that greatly enhances coverage and performance while reducing equipment costs and maintenance.

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2 Product Features and Benefits

Key features and benefits of the Pepwave AP series:

- High-powered Wi-Fi transmitter enhances coverage and lowers cost of ownership.
- Independent security policies and encryption mechanisms for each virtual access point allow fast, flexible, cost-effective network builds.
- Centralized management via InControl reduces maintenance expense and time.
- WDS support allows secure and fast network expansion.
- Guest Protect support guards sensitive business data and sub-networks.

  WMM (Wi-Fi Multimedia) and QoS (Quality of Service) support keeps video and other bandwidth-intensive data flowing fast and lag-free.

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3 Package Contents

3.1 AP One

Each Pepwave AP One package contains:

- 1 x Pepwave AP One
- 1 x omni-directional antenna
- 1 x power supply
- 1 x instruction sheet

3.2 AP One 300M

Each Pepwave AP One 300M package contains:

- 1 x Pepwave AP One 300M
- 2 x omni-directional antennas
- 1 x power supply
- 1 x instruction sheet

3.3 AP One mini

Each Pepwave AP One mini package contains:

- 1 x Pepwave AP One mini
- 1 x omni-directional antenna
- 1 x power supply
- 1 x instruction sheet

3.4 AP One X

Each Pepwave AP One X package contains:

- 1 x Pepwave AP One X
- 1 x omni-directional antenna
- 1 x instruction sheet
- 1 x installation guide

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3.5 AP Pro X

Each Pepwave AP Pro X package contains:

- 1 x Pepwave AP Pro X
- 1 x instruction sheet
- 1 x installation guide

3.6 Flex AP

Each Pepwave Flex AP package contains:

- 1 x Pepwave Flex AP
- 1 x instruction sheet
- 1 x installation guide

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4 Hardware Overview

4.1 AP One

Front View

Rear Panel View

Connectors	
Antenna (Left Connector)	RP-SMA connector for attaching the antenna.
WAN	10/100BaseT Ethernet connector, normally connected to a back haul network.
Reset	Inset reset button. Depress with a pin and hold for at least five seconds to restore factory defaults. For further details, please refer to Restoring Factory Defaults.
Power Connector	DC 12V power input for use with the supplied power adapter.

LED Indicators	
Power	OFF– Power is off.
	ON – Power is on.
Status	OFF – Unit is initializing.
	ON – Unit is ready.
Ethernet	OFF – Ethernet port is not connected.
	ON – Ethernet port is connected.
Wireless	OFF – Wireless is not ready.
	On – Wireless is ready.

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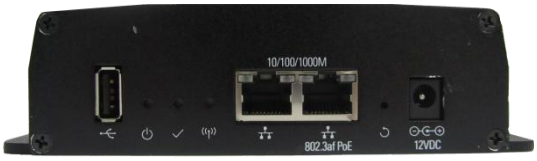
4.2 AP One 300M

Front View

Rear Panel View



Connectors	
USB	Reserved for future functionality.
WAN	10/100BaseT Ethernet connector, normally connected to a back haul network.
WAN 802.3af PoE	10/100BaseT Power over Ethernet 802.3af connector, normally connected to a back haul network.
Reset	Inset reset button. Depress with a pin and hold for at least five seconds to restore factory defaults. For further details, please refer to Restoring Factory Defaults.
Power Connector	DC 12V power input for use with the supplied power adapter.

LED Indicators	
Power	OFF – Power is off.
	ON – Power is on.
Status	OFF – Unit is initializing.
	ON – Unit is ready.
Wireless	OFF – Wireless is not ready.
	On – Wireless is ready.

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4.3 AP One mini

Front View

Rear Panel View

Connectors	
USB	Reserved for future functionality.
Power Connector	DC 12V power input for use with the supplied power adapter.
WAN	10/100BaseT Ethernet connector, normally connected to a back haul network.
Antenna (Right Connector)	RP-SMA connector for attaching the antenna.

LED Indicators	
PWR	OFF – Power is off.
	ON – Power is on.
RDY	RED – Device is not booted.
	AMBER – Device is not booted.
ENET	OFF – Ethernet port is not connected.
	ON – Ethernet port is connected.
	OFF – No client is associated.
	ON – Clients are associated.
	Each bar indicates an increase of up to 10 connected clients. The shortest bar indicates from one to 10 clients while the longest indicates 31 or more clients.

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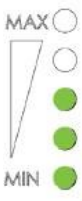
4.4 AP One X

Front View

Rear Panel View

Connectors	
WAN	10/100BaseT Power over Ethernet 802.3af connector, normally connected to a back haul network.
Reset	Inset reset button. Depress with a pin and hold for at least five seconds to restore factory defaults. For further details, please refer to Restoring Factory Defaults.
Antenna (Right Connector)	Female N-type connector for attaching the antenna.

LED Indicators	
PWR	OFF – Power is off.
	ON – Power is on.
LAN	OFF – Ethernet port is not connected.
	ON – Ethernet port is connected.
Wi-Fi	OFF – Wi-Fi is not ready.
	ON – Wi-Fi is ready.
	OFF – No client is associated.
	ON – Clients are associated.
	Each light indicates an increase of up to 10 connected clients. The first light (MIN) indicates from one to 10 clients, while the last (MAX) indicates 41 or more clients.

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4.5 AP Pro X

Front View

Top View

Rear Panel View

Connectors	
Antenna	Female N-type connectors for attaching antennas.
Ground	Ground connection.
Console	RJ-45 Console connector for Pepwave Console Adapter with remote factory reset functionality.
WAN	10/100BaseT Power over Ethernet 802.3af connector, normally connected to a back haul network.
Power Connector	A connector for DC 10V-30V power input, to be used with the supplied waterproof power connector.

LED Indicators	
Status	OFF – Power is off.
	RED – Unit is initializing.
	GREEN – Unit is ready.

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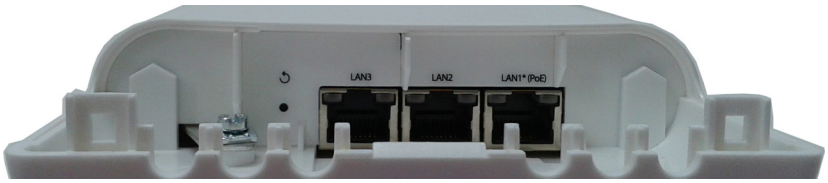
4.6 Flex AP

Front View

Rear LED Indicators

Connectors Panel inside the lid



Connectors	
LAN1*PoE	10/100BaseT Power over Ethernet Passive PoE connector
LAN2 / 3	Ethernet LAN Port
Reset	Inset reset button. Depress with a pin and hold for at least five seconds to restore factory defaults. For further details, please refer to Restoring Factory Defaults.

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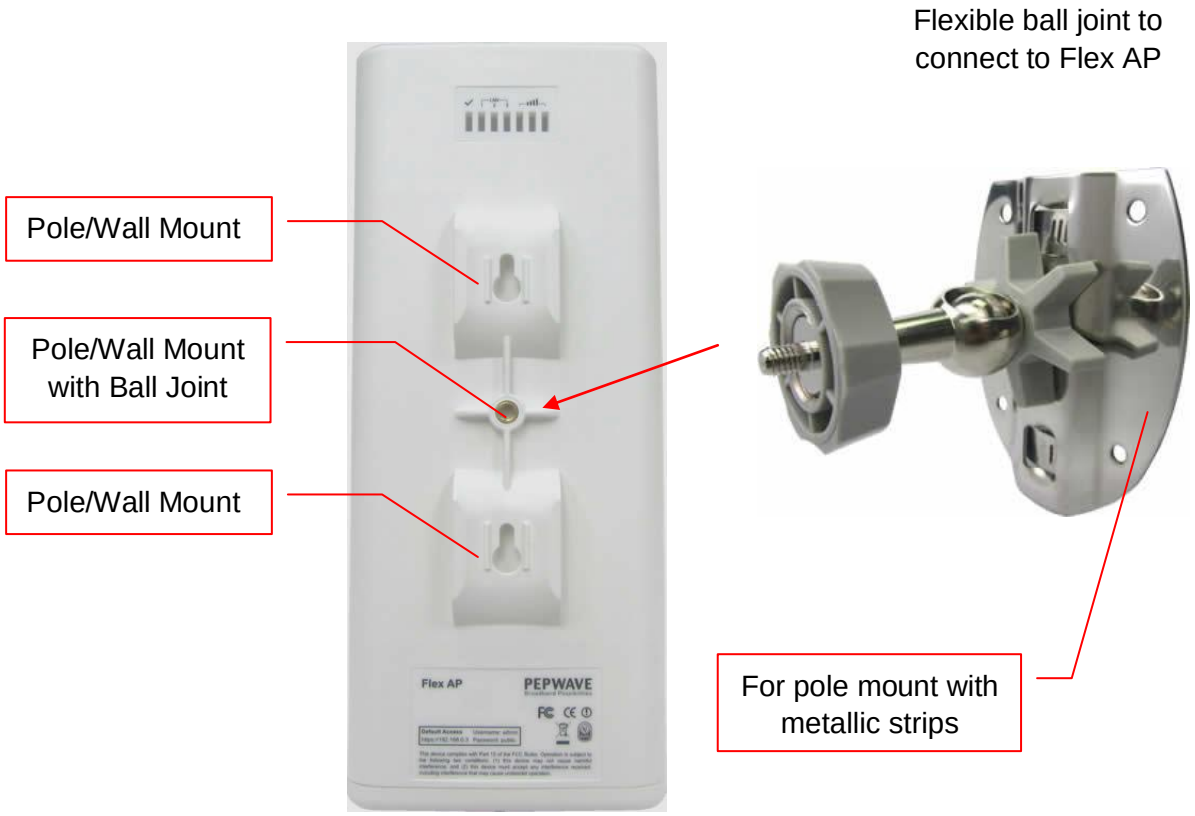
LED Indicators	
✔	OFF – Unit is initializing.
	ON – Unit is ready.
LAN	OFF – Ethernet port is not connected.
	ON – Ethernet port is connected.
📶	Indicate the signal strength.

Mounting the Unit

Pepwave Flex AP can be mounted on a flat surface or a pole using the wall/pole mount (available separately).



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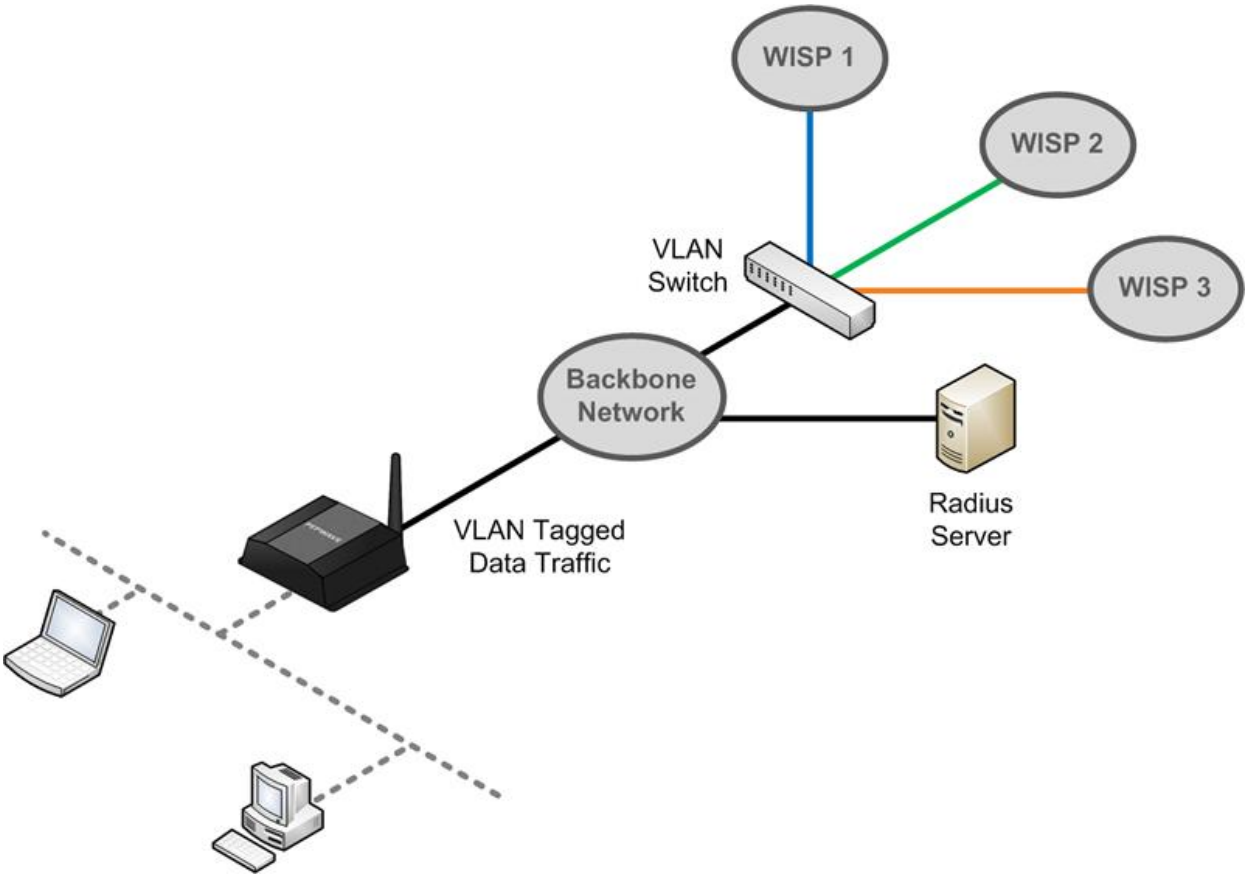
5 Installation

Your Pepwave access point acts as a bridge between wireless and wired Ethernet interfaces. A typical setup follows:



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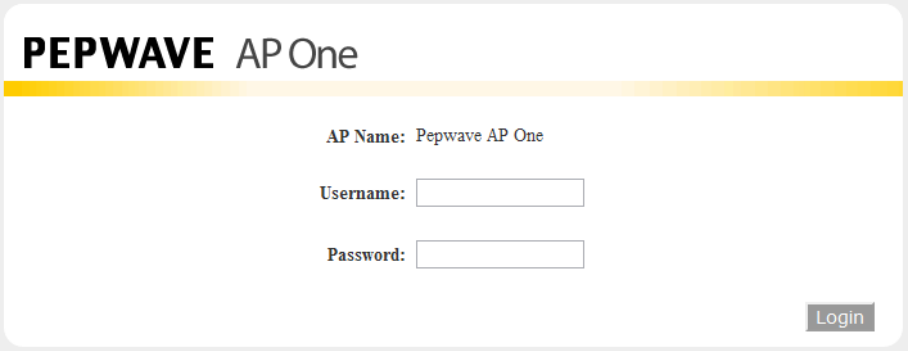
5.1 Installation Procedures

1. Attach the antenna to your Pepwave access point.
2. Connect the Ethernet port on the unit with the backbone network using an Ethernet cable. The port should auto sense whether the cable is straight-through or crossover.
3. Connect the power adapter to the power connector of the unit. Plug the power adapter into a power source.
4. Wait for the status LED to turn green.
5. Connect a PC to the backbone network. Configure the IP address of the PC to be any IP address between 192.168.0.4 and 192.168.0.254, with a subnet mask of 255.255.255.0.
6. Using Microsoft Internet Explorer 6 or above, Mozilla Firefox 2.0 or above, or Google Chrome 2.0 or above, connect to https://192.168.0.3.
7. Enter the default admin login ID and password, **admin** and **public** respectively.



After logging in, the following Information main page appears. Click **System**, located under **Configure** on the left, to begin setting up your access point.

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6 Information

The **Information** section contains a number of tabs to keep you up-to-date on your access point's status and operation.

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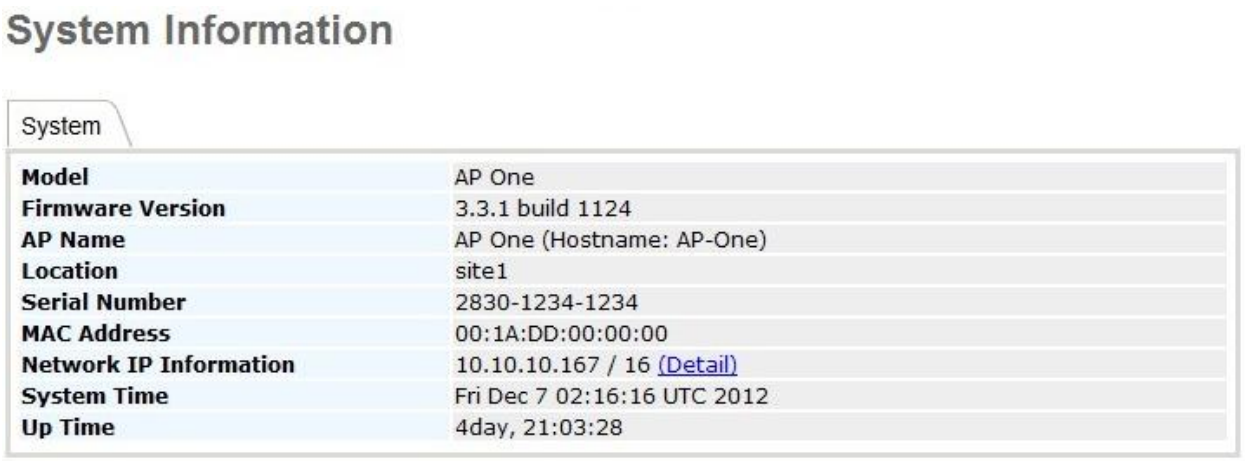
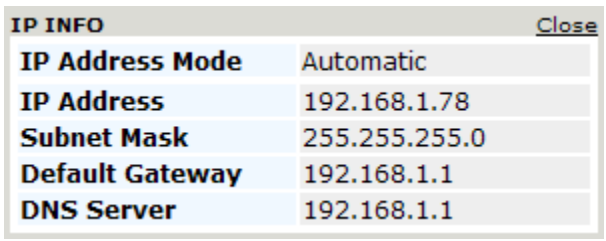
6.1 System

Click **System,** located under **Information** on the left, to display tabs for basic and advanced AP configuration options.



System Information	
Model	Model name of your access point.
Firmware Version	Firmware version number running on your access point.
AP Name	Name of your access point as defined in the configuration.
Location	Location of your access point as defined in the configuration.
Serial Number	Serial number of your access point.
MAC Address	MAC address of your access point.
Network IP Information	Current gateway IP address of your access point.
System Time	Current system time with respect to the configured time.
Up Time	Up time of your access point since the most recent boot.

Click the **Detail** link next to **Network IP Information** to check **IP Address Mode**, **IP Address**, **Subnet Mask**, **Default Gateway**, and **DNS Server**.



Click **Close** to dismiss the **IP Info** dialog.

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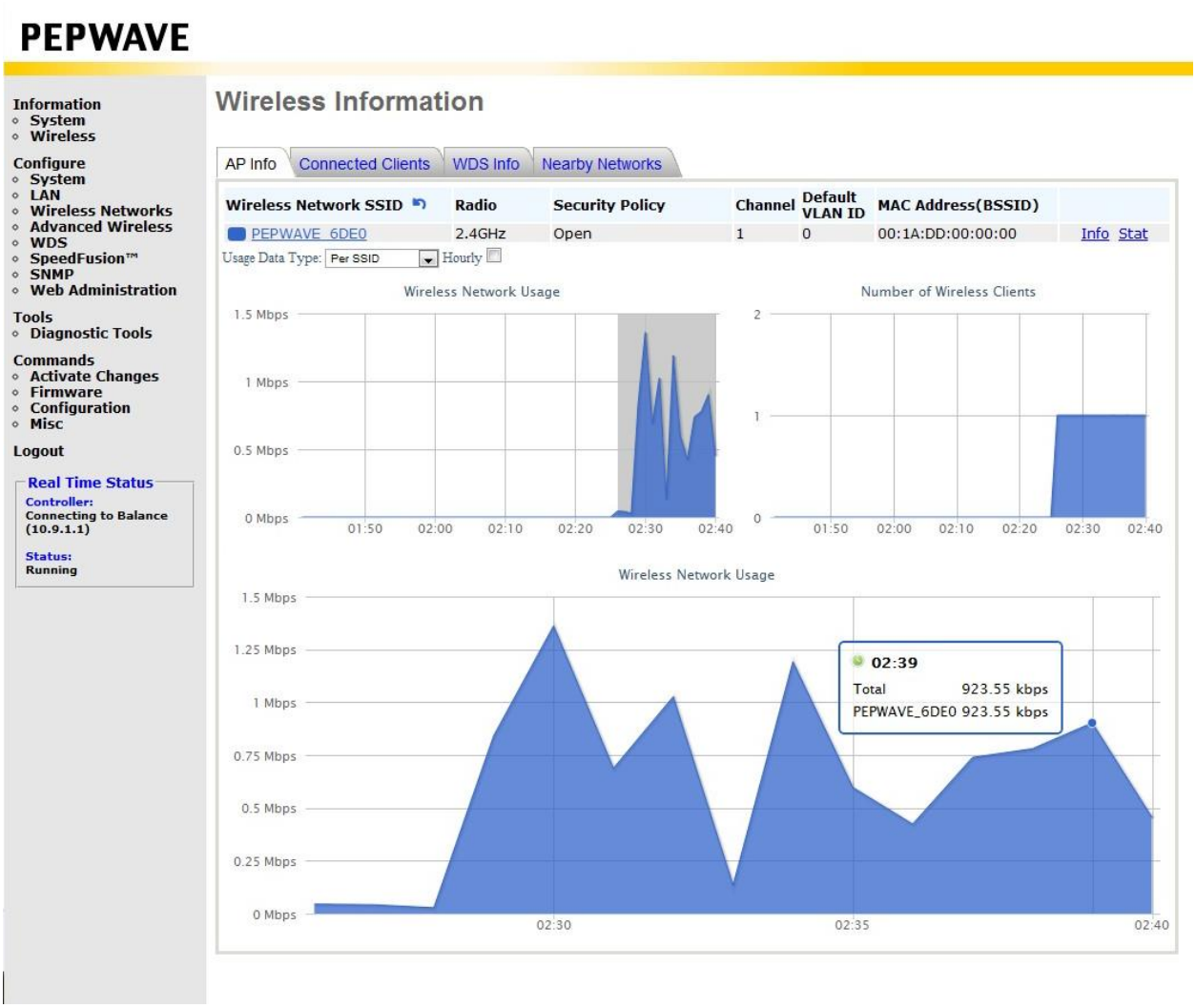
6.2 Wireless

Click **Wireless,** located under **Information** on the left, to display tabs containing information about your Pepwave access point, connected clients, WDS, and nearby networks.



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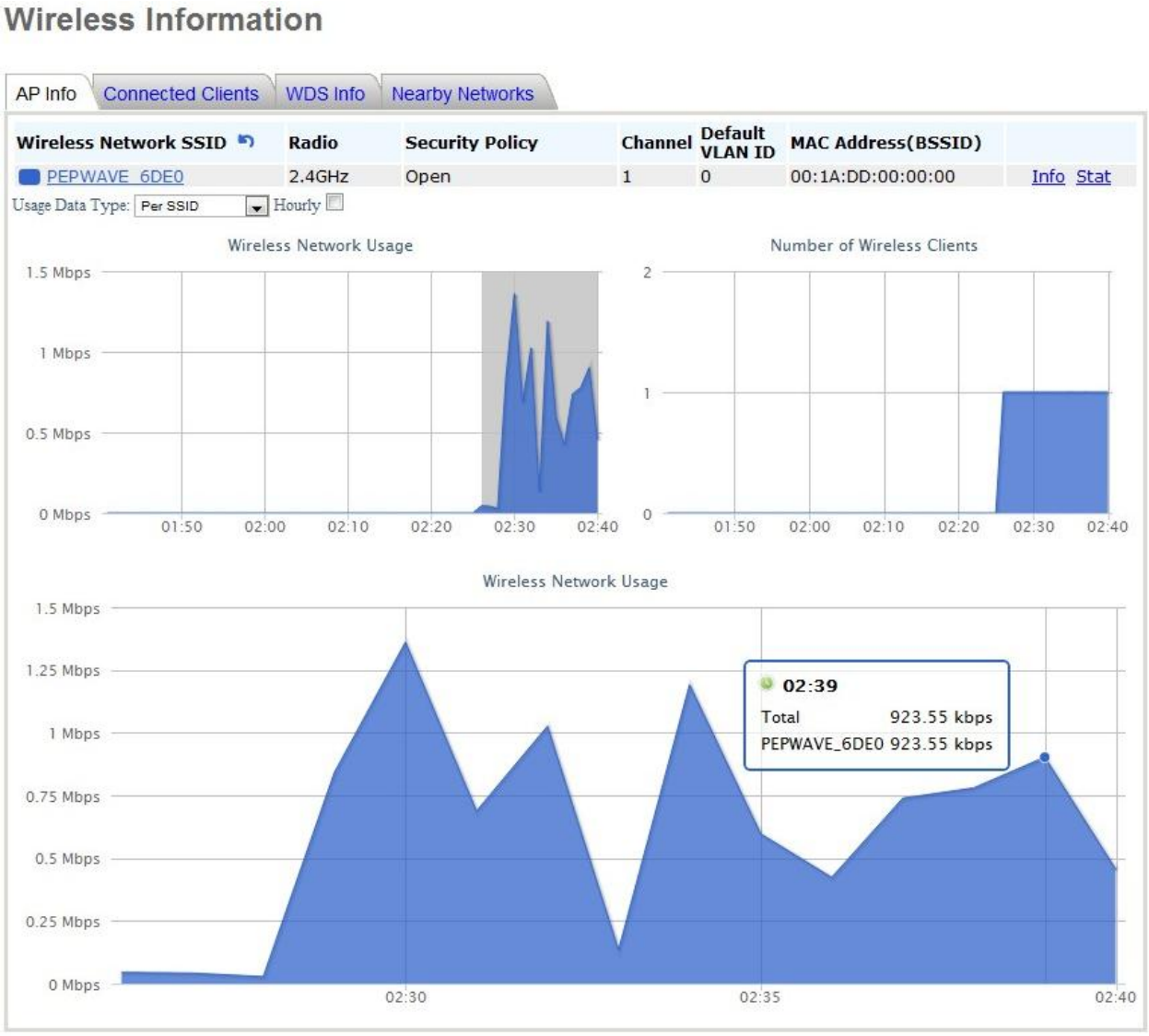
6.2.1 AP Info



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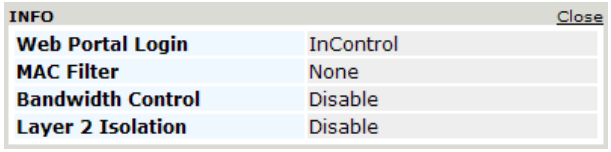
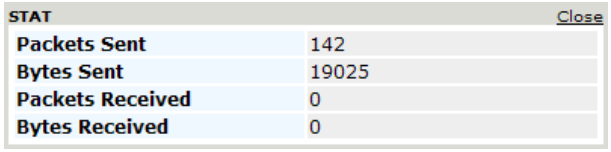
Wireless Information – AP Info	
Wireless Network SSID	SSID of your access point.
Radio	Frequency used by your access point's radio.
Security Policy	Wireless authentication and encryption methods used by your access point.
Channel	802.11 channel used by your access point.
Default VLAN ID	VLAN ID tagged onto all outgoing packets generated using the current wireless network profile.
MAC Address (BSSID)	Detailed BSSIDs for the current wireless network profile.
Usage Data Type	Data display used in the **Wired Network Usage** graph. Check **Hourly** to display usage in 60-minute increments.
Wireless Network Usage	Wireless network usage displayed using the options selected from the **Usage Data Type** drop-down menu and the **Hourly** checkbox.
Number of Wireless Clients	Number of wireless clients displayed using the options selected from the **Usage Data Type** drop-down menu and the **Hourly** checkbox.

Click **Info** to see **Web Portal Login**, **Wireless Network Firewall**, **MAC Filter**, **Bandwidth Control**, and **Layer 2 Isolation**.



Click **Close** to dismiss the **Info dialog**.

Click **Stat** to check **Packets Sent**, **Bytes Sent**, **Packets Received**, and **Bytes Received**.



Click **Close** to dismiss the **Stat** dialog.

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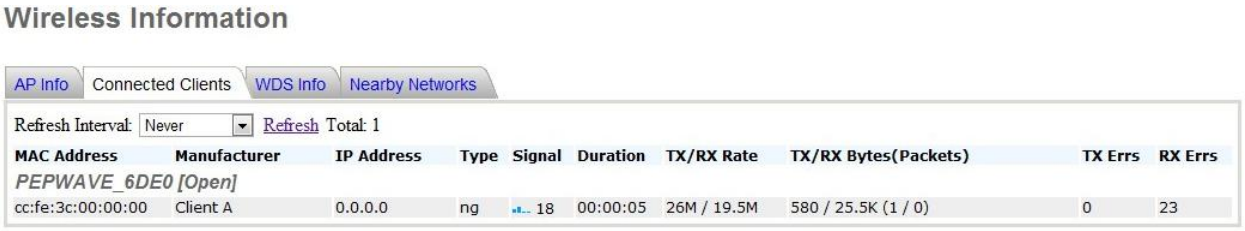
6.2.2 Connected Clients



Wireless Information – Connected Clients	
Refresh Interval	Interval used when refreshing connected client data.
Refresh	Click to manually refresh connected client data.
Total	Number of connected clients since the last refresh.
MAC address	Client MAC address.
Manufacturer	AP manufacturer name, based on MAC prefix.
IP Address	IP address of the connected client.
Type	Radio mode of the connected client.
Signal	Signal strength of the connected client.
Duration	Time the listed client has been connected to the network, as reported at the last refresh.
TX/RX Rate	Transmit and receive data rates for the connected client, as reported at the last refresh.
TX/RX Bytes (Packets)	Transmit and receive data volume for the connected client, as reported at the last refresh. Packet data shown in parenthesis.
TX Errs	Number of transmit errors for the connected client, as reported at the last refresh.
RX Errs	Number of receive errors for the connected client, as reported at the last refresh.

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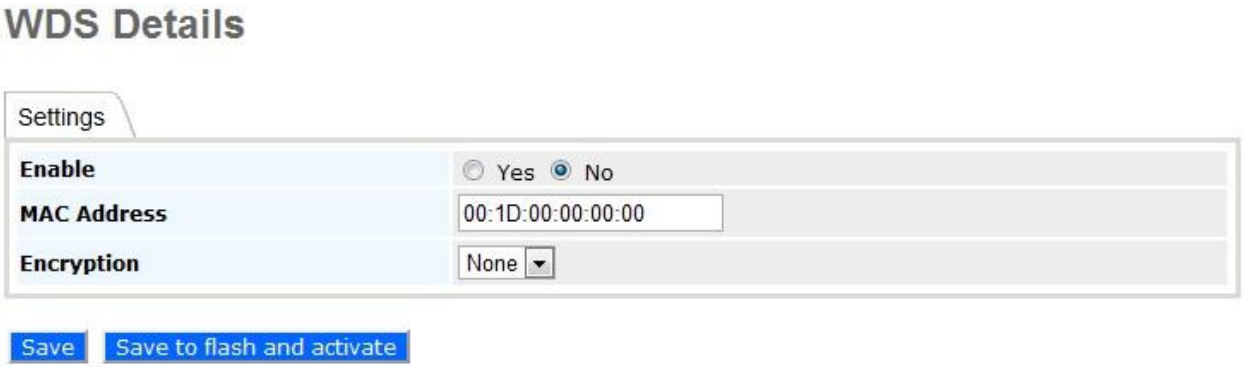
6.2.3 WDS Info

Wireless Information – WDS Info	
Local MAC Address	MAC address identifying the local system.
Current Channel	Current 802.11 broadcast channel used by the system.
Manufacturer	Access point manufacturer name, based on MAC prefix.
MAC Address	MAC address for connected peers.
Status	Current WDS status: **enabled** or **disabled**.
Encryption	Encryption method used by the WDS.

Click **Edit** to **enable** or **disable** WDS, edit the WDS MAC address, and select an encryption method.



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6.2.4 Nearby Networks

Wireless Information – Nearby Networks	
Network Discovery	Displays whether your access point is set to scan and discover nearby access points.
Scanning Interval	How often your access point scans for nearby access points, providing **Network Discovery** is **Enabled**.
Scanning Time	Channel scan interval used by your access point when searching for nearby access points.
Group by	Grouping method used for display of nearby access points.
Manufacturer	Access point manufacturer name, based on MAC prefix.
SSID	SSID used to refer to the nearby access point.
Security	Client authentication method(s) used by the nearby access point.
MAC address	MAC address of the nearby access point.
Channel	Channel used by the nearby access point.
Signal (RSSI)	Radio signal strength of the nearby access point.
Last Seen	Time stamp indicating when the nearby access point was last seen, if at all.
Status	Current status of the nearby access point.
Quantity drop-down menu	Number of nearby access points to display on one page.
Refresh	Click this link to manually refresh nearby access point data.

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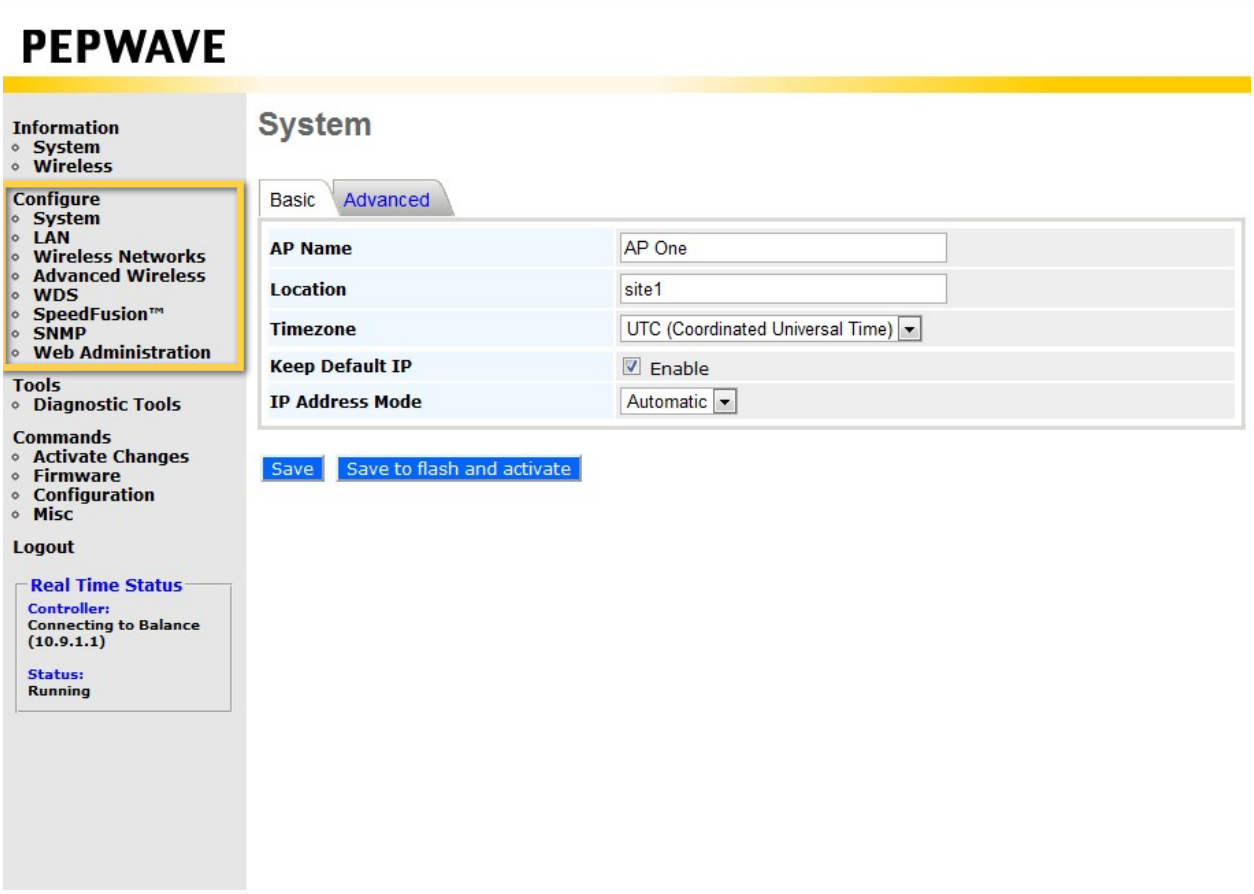
7 Configuration

The **Configure** section allows you to set up all aspects of your Pepwave access point, from



basic system settings to advanced wireless options and more.

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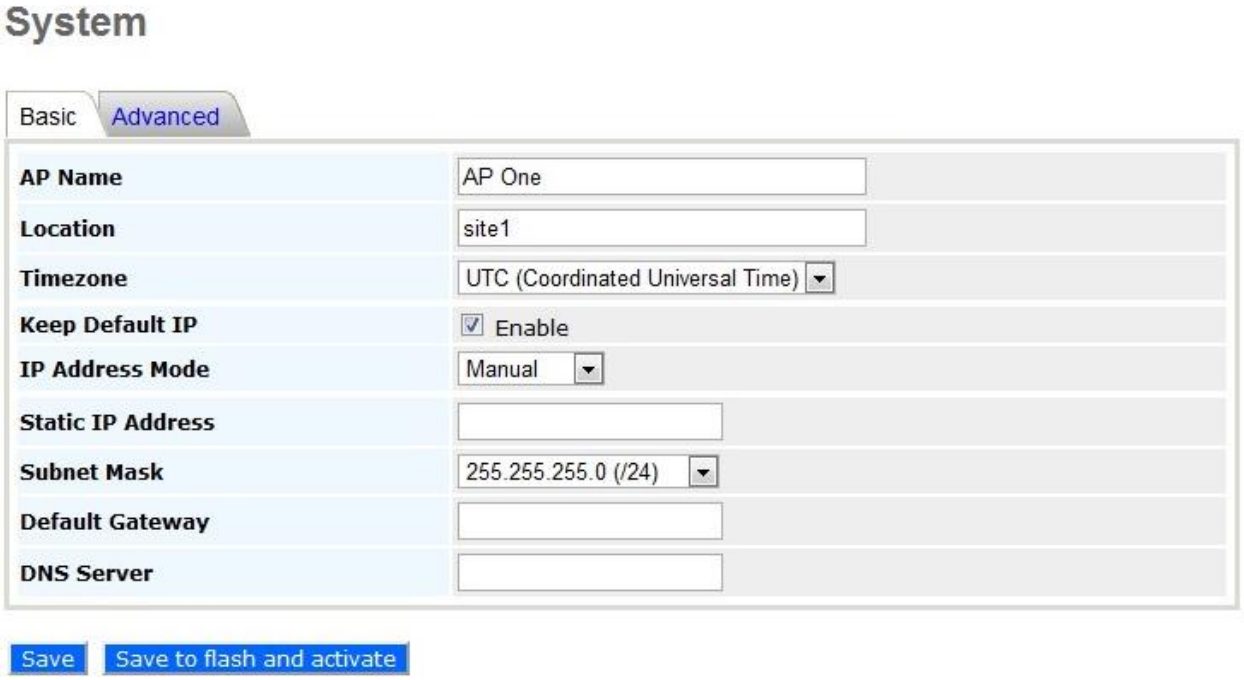
7.1 System

Click **System, located** under **Configure** on the left, to display tabs for basic and advanced AP configuration options.



7.1.1 Basic

System Settings - Basic	
AP Name	User-specified name assigned to your Pepwave access point. This name can be retrieved via SNMP.
Location	User-specified name for the location of your access point. This name can be retrieved via SNMP.
Timezone	Time region used by the system. All choices are based on UTC.
Keep Default IP	When enabled, this option maintains **192.168.0.3** as your access point's default IP address.
IP Address Mode	**IP Address Mode** options are **Automatic** and **Manual**. **Automatic**: The IP address of your access point is acquired from a DHCP server on the Ethernet segment. **Manual**: A user-specified IP address is used for your access point. See next page for an example.

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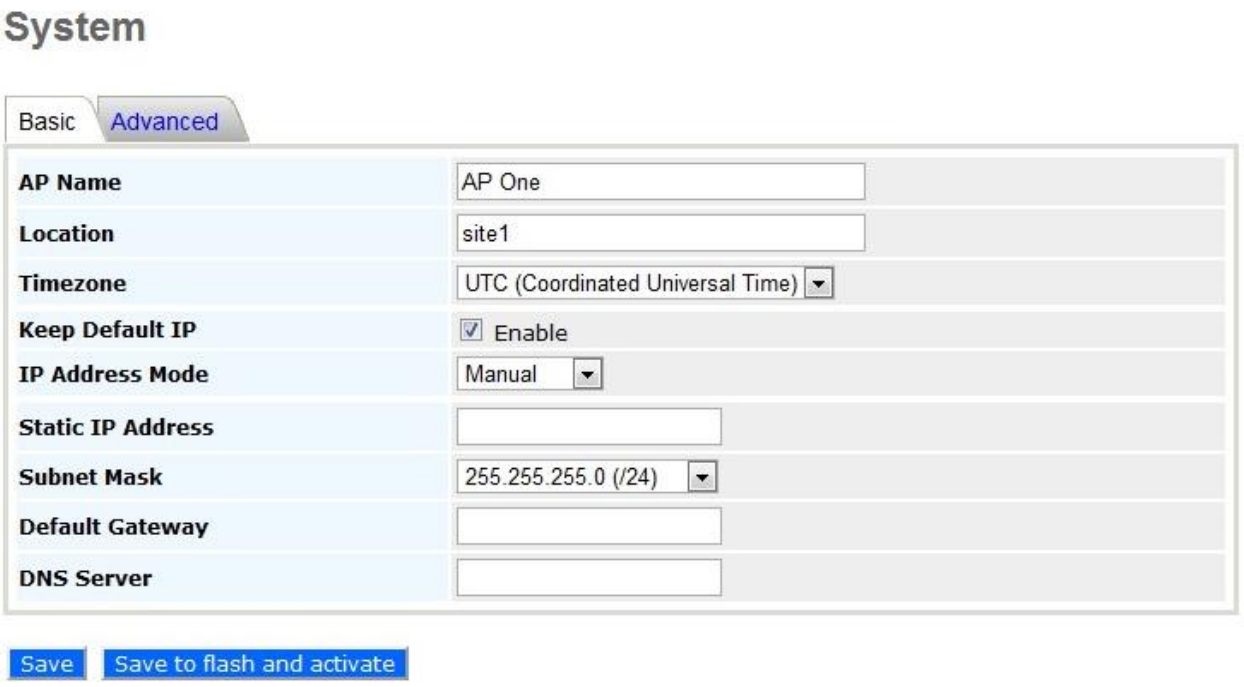

IP Address Mode – Manual	
Static IP Address	Unique IP address used by your Pepwave access point to communicate on the Ethernet segment. This IP address is distinct from the admin IP address (192.168.0.3) on the Ethernet segment.
Subnet Mask	Subnet mask used by your access point.
Default Gateway	Default gateway used by your access point.
DNS Server	DNS server address used by your Pepwave access point to resolve host names.

IP Address Mode –Advanced	
PPPoE Username	This specifies the username required in order to connect via PPPoE to acquire Internet connectivity. The information is typically determined by and can be obtained from the ISP.
PPPoE Password	This specifies the password required in order to connect via PPPoE to acquire Internet connectivity. The information is typically determined by and can be obtained from the ISP.
PPPoE Service Name	This is a PPPoE parameter which is provided by the ISP. Note: Leave this field empty if you are not sure.

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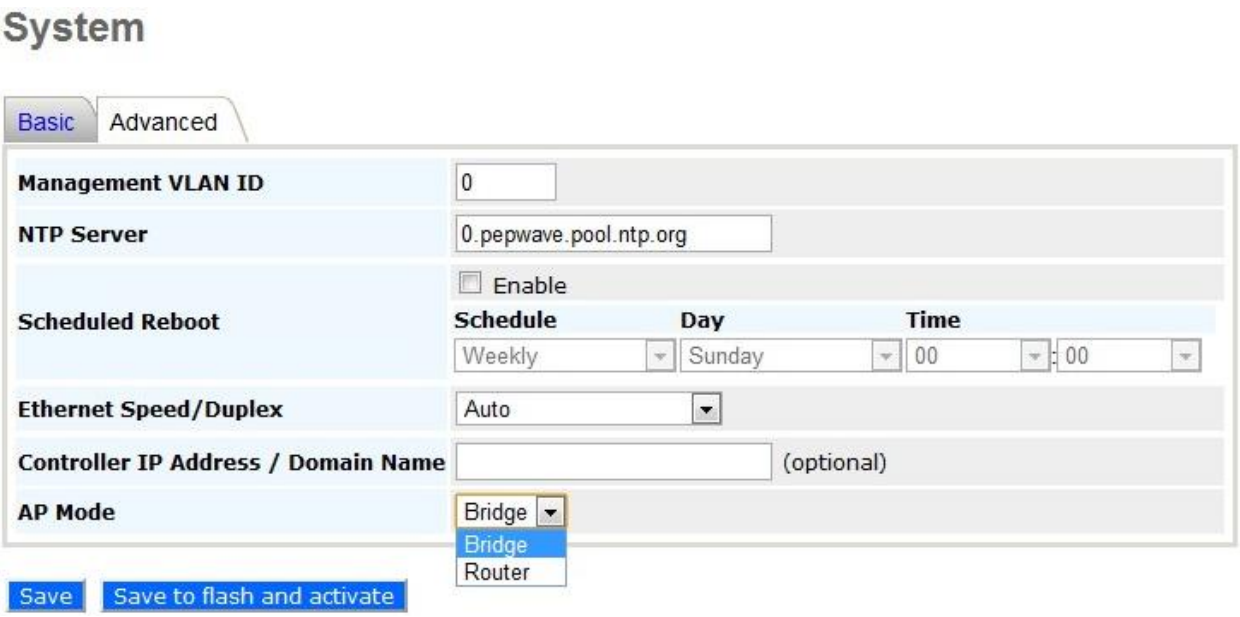
7.1.2 Advanced



System Settings - Advanced	
Management VLAN ID	VLAN ID from which management sessions are allowed. Establishment of management sessions is restricted to the specified VLAN ID. If **Management VLAN ID** is set to **0**, management sessions can be established without VLAN ID restrictions. Default value is **0**, which means that **tagging is disabled**, not that management sessions will be tagged with **0**.
NTP Server	Network Time Protocol (NTP) Server hostname used when synchronizing your access point's system clock. Default value is **pool.ntp.org**.
Scheduled Reboot	Automatic reboot schedule. Check **Enable**, then set the reboot schedule using the **Schedule**, **Day**, and **Time** drop-down menus.
Ethernet Speed/Duplex	Ethernet send and receive speed.
Controller IP Address / Domain Name	IP address or domain name of an optional Peplink Balance AP Controller. Leave this field blank if not using a Balance AP Controller.
AP Mode	Access point operation mode. Choose **Bridge** or **Router**. When **Router** is selected, the following **Manual Router Settings** will be available:

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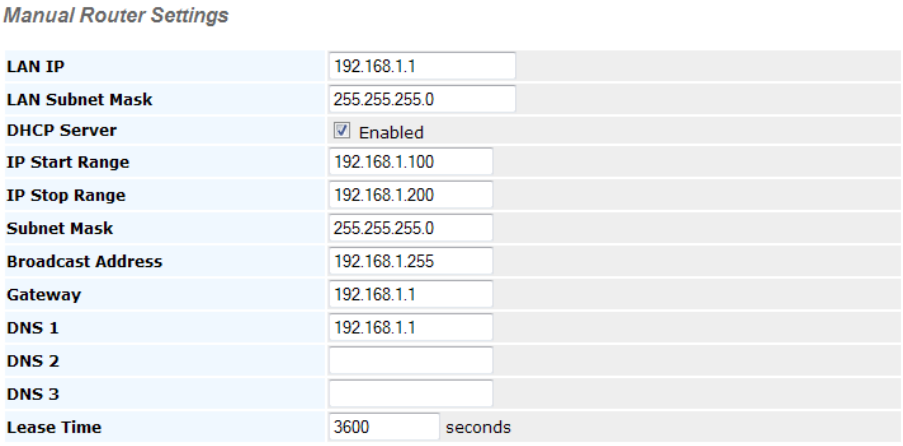
7.1.2.1 Manual Router Settings

Manual Router Settings are available only when **AP Mode** in **Advanced System Settings** is set to **Router**. When using **Router** mode, your Pepwave access point can be used as a DHCP server for devices located behind it in the network.



Manual Router/DHCP Server Parameters	
LAN IP	DHCP server IP address.
LAN Subnet Mask	Subnet mask of the DHCP server.
DHCP Server	Check to enable the DHCP server feature of your Pepwave access point. The following options will be enabled once you have checked and enabled **DHCP Server**.
IP Start Range	First address in the range of IP addresses assigned to DHCP clients.
IP Stop Range	Last address in the range of IP addresses assigned to DHCP clients.
Subnet Mask	Subnet mask used by DHCP clients.
Broadcast Address	Broadcast address used by DHCP clients.
Gateway	Default routing gateway used by DHCP clients.
DNS 1	IP address of the primary DNS server offered to DHCP clients.
DNS 2	IP address of the secondary DNS server offered to DHCP clients.
DNS 3	IP address of the tertiary DNS server offered to DHCP clients.
Lease Time	Length of time that an IP address of a DHCP client remains valid. When lease time has expired, the assigned IP address is no longer valid, and renewal of the IP address assignment is required.

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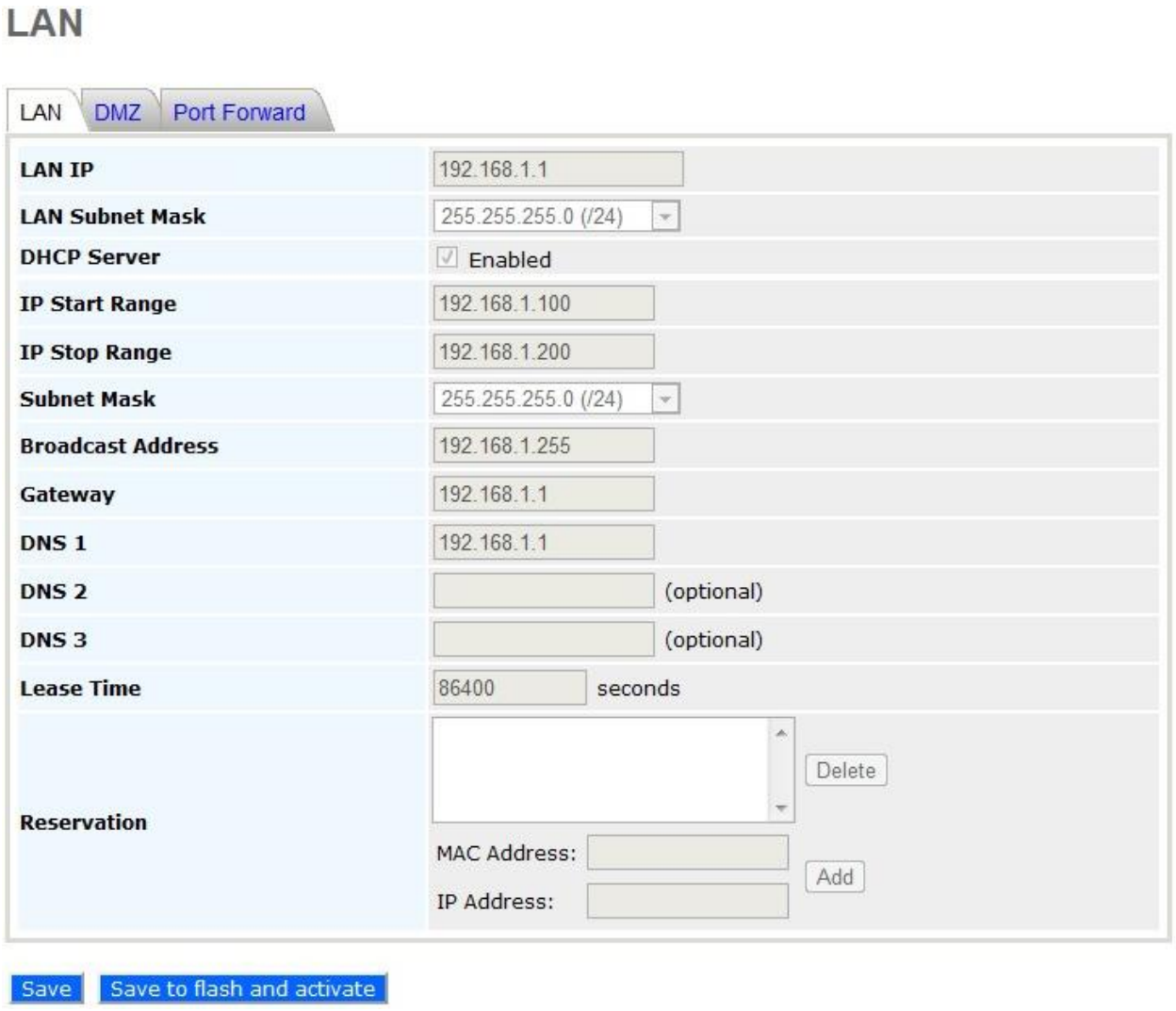
7.2 LAN

Select **LAN**, located under **Configure** on the left, to begin configuring a local area network for your Pepwave access point.

7.2.1 LAN



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LAN	
LAN IP	IP address of your Pepwave access point.
LAN Subnet Mask	Specifies the number of clients that can connect to your access point.
DHCP Server	Check to enable the DHCP server feature of your access point. Enabling DHCP is the best option for most users. The following options will be enabled once you have checked and enabled **DHCP Server**.
IP Start Range	First address in the range of IP addresses assigned to DHCP clients. Default is **192.168.1.100**
IP Stop Range	Last address in the range of IP addresses assigned to DHCP clients. Default is **192.168.1.200**.
Subnet Mask	Number of clients that can connect to your access point. This value should match the value in **LAN Subnet Mask**. Default is **255.255.255.0**.
Broadcast Address	Broadcast address used by DHCP clients.
Gateway	Default routing gateway used by DHCP clients.
DNS 1	IP address of the primary DNS server offered to DHCP clients.
DNS 2	IP address of the secondary DNS server offered to DHCP clients.
DNS 3	IP address of the tertiary DNS server offered to DHCP clients.
Lease Time	Length of time that an IP address of a DHCP client remains valid. When lease time has expired, the assigned IP address is no longer valid, and renewal of the IP address assignment is required.
Reservation	Assigns an IP address to a specific MAC address. To add a new reservation, enter **MAC address** and **IP Address**, then click **Add**. To remove a reservation from the displayed list, click **Delete**.

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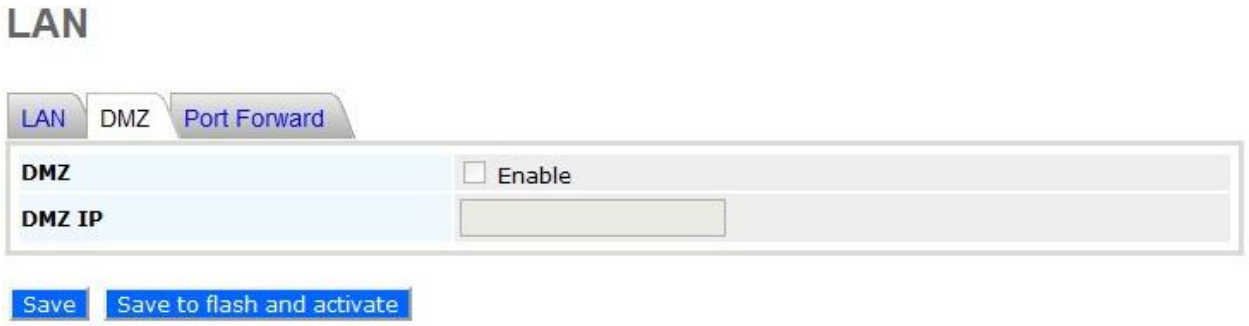
7.2.2 DMZ



DMZ	
DMZ	Enable your AP One unit to become a DMZ device.
DMZ IP	Address used by external users to connect to your IP's ports.

7.2.3 Port Forward

Port Forward	
Name	Name for your port forwarding rule.
IP	IP address to which ports are forwarded.
Port	Choose **TCP** or **UDP** to forward the selected port or port range using the specified protocol. Select port options from the drop-down menus on the right, then click **Apply** to make the port forwarding rule active.

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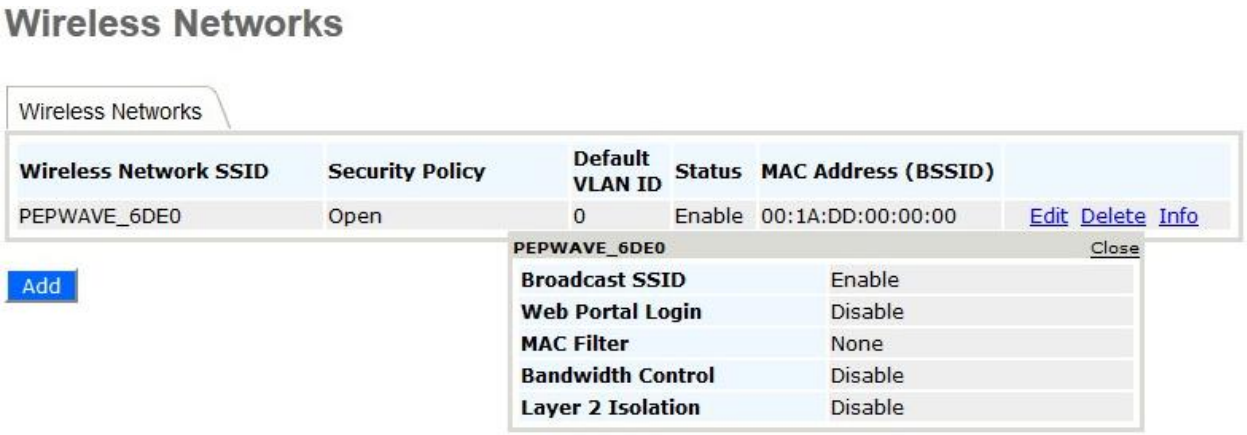
7.3 Wireless Networks

Select **Wireless Networks**, located in the **Configure** section on the left, to display your Pepwave access point's SSID configuration.



General Wireless Network Settings	
Wireless Network SSID	SSID of the virtual access point.
Security Policy	Wireless authentication and encryption used by your Pepwave access point.
Default VLAN ID	VLAN ID tagged on all outgoing packets generated by the virtual AP (i.e., packets traveling from the Wi-Fi segment through your access point to the Ethernet segment via the LAN port). If 802.1x is enabled, a per-user VLAN ID can be specified in the authentication reply from the RADIUS server. If a per-user VLAN ID is set, the default VLAN ID will be overridden.
Status	Virtual AP status of your access point. Displays **Enable** or **Disable**.
MAC Address (BSSID)	Detailed BSSID used by your access point.

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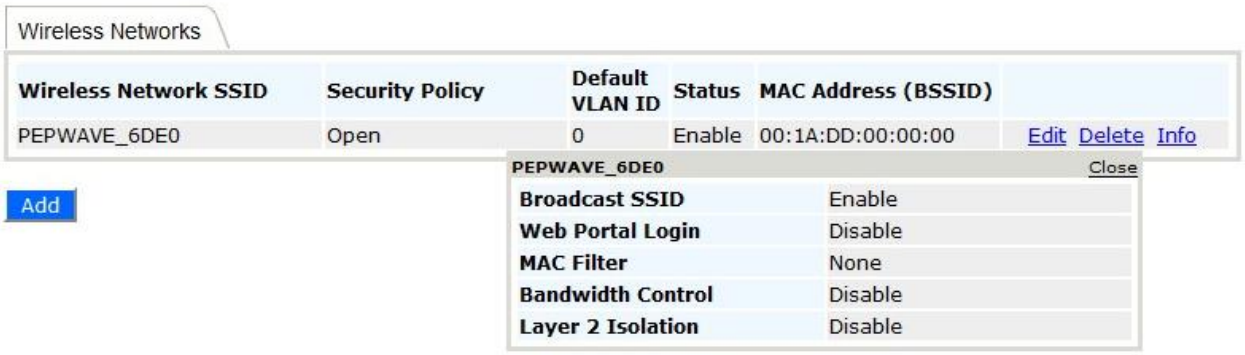
Click **Info** to check **Broadcast SSID**, **Web Portal Login**, **MAC Filter**, **Bandwidth Control**, and **Layer 2 Isolation**.



General Wireless Networks Settings – Info	
Broadcast SSID	Displays whether or not your Pepwave access point's SSID is broadcast.
Web Portal Login	Displays whether or not your access point can be accessed via Web portal.
MAC Filter	Displays whether or not your access point controls access with MAC address filters.
Bandwidth Control	Displays whether or not your access point is using bandwidth controls.
Layer 2 Isolation	Displays whether or not your access point is using Layer 2 isolation.

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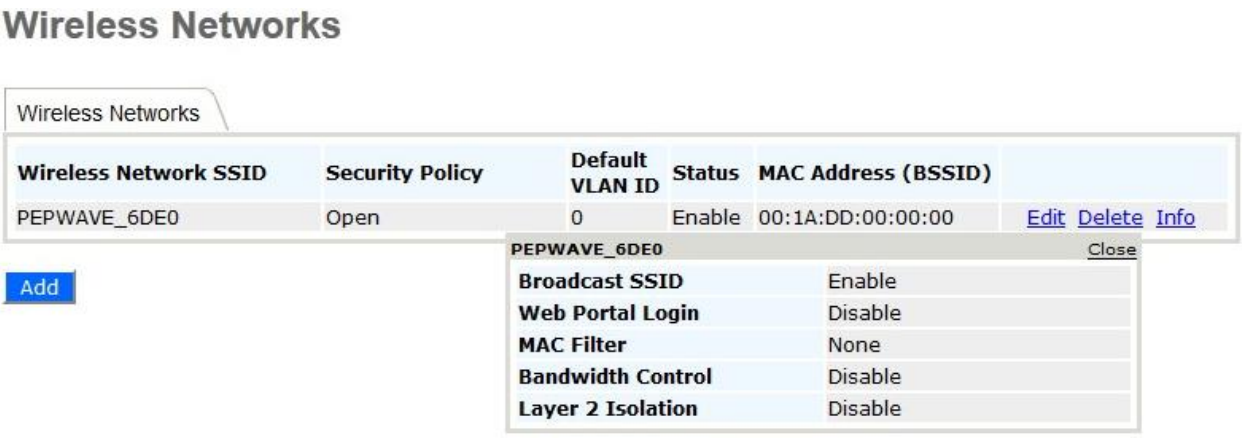
To add a new virtual AP, click the **Add** button. To change network details for a virtual AP, click its **Edit** link, which give you access to **Wireless Network Details**, explained on the next page.



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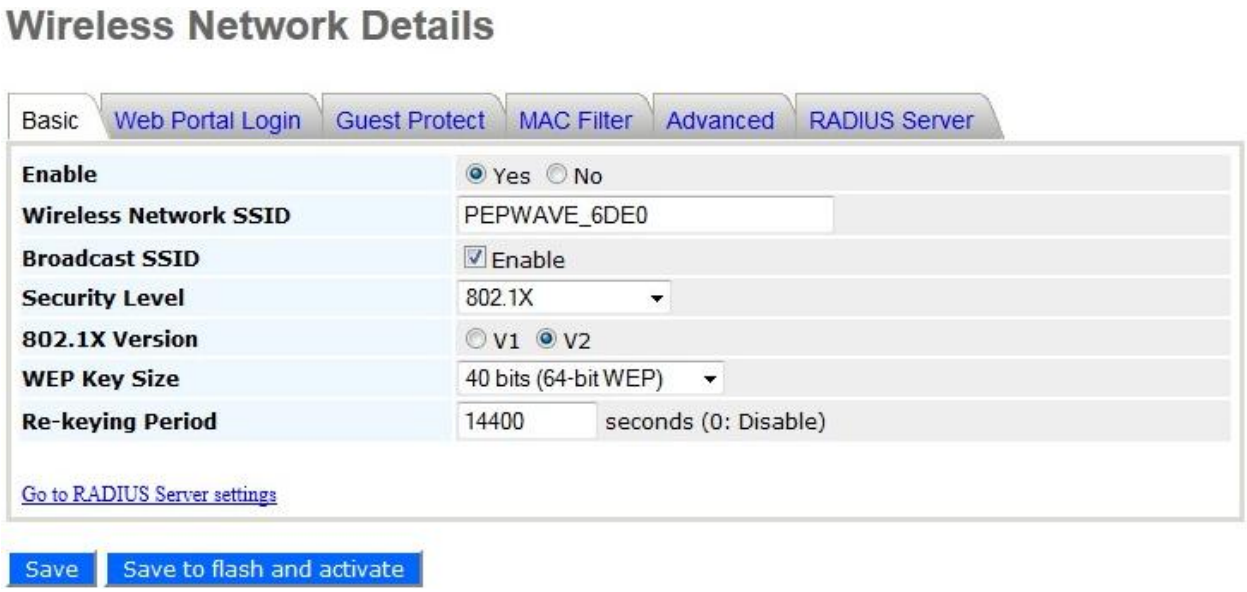
7.3.1 Wireless Network Details - Basic



Wireless Network Details - Basic	
Enable	Select **Yes** to enable the virtual AP. Select **No** to disable. The virtual AP is **enabled** by default.
Wireless Network SSID	SSID of the virtual AP as it appears to Wi-Fi clients.
Broadcast SSID	Check **Enable** to allow Wi-Fi clients to scan the virtual AP's ESSID. Note that the BSSID (i.e., the MAC address of the virtual AP) cannot be hidden from the scan. To associate with the virtual AP, clients must specify the correct ESSID upon association. **Broadcast SSID** is **enabled** by default.
Security Level	Configures wireless authentication and encryption methods used by the virtual AP. Available options are **Open - No Encryption**, **Static WEP**, **802.1X**, **WPA-TKIP,** and **WPA2-AES:CCMP**. For details on setting encryption options, please see **Static WEP Parameters**, **802.1x Parameters**, **WPA Parameters** in the following sections.

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7.3.1.1 Static WEP Parameters

The configuration of **Static WEP** parameters enables pre-shared WEP key encryption. Please note that static WEP offers weak security and does not support authentication.

Static WEP Parameters	
Key Size	Choose **40 bits (64-bit WEP)** or **104 bits (128-bit WEP)**. When using the **WDS** setting, **128 bits** will also be available.
Key Format	Choose **ASCII** or **HEX**.**ASCII** can be applied only to encryption keys that are manually entered. **HEX** can be applied to encryption keys that are manually entered or automatically generated.
Passphrase	Combination of words and characters used to generate an encryption key. Click **Generate Key** to create the key.
Encryption Key	User-specified encryption key value. For **ASCII** format, key length is either **5 or 13**. For **HEX** format, key length is either **10 or 26**.
Shared Key Authentication	Check to **enable** shared key authentication. Default is **disabled**, meaning open authentication is used.

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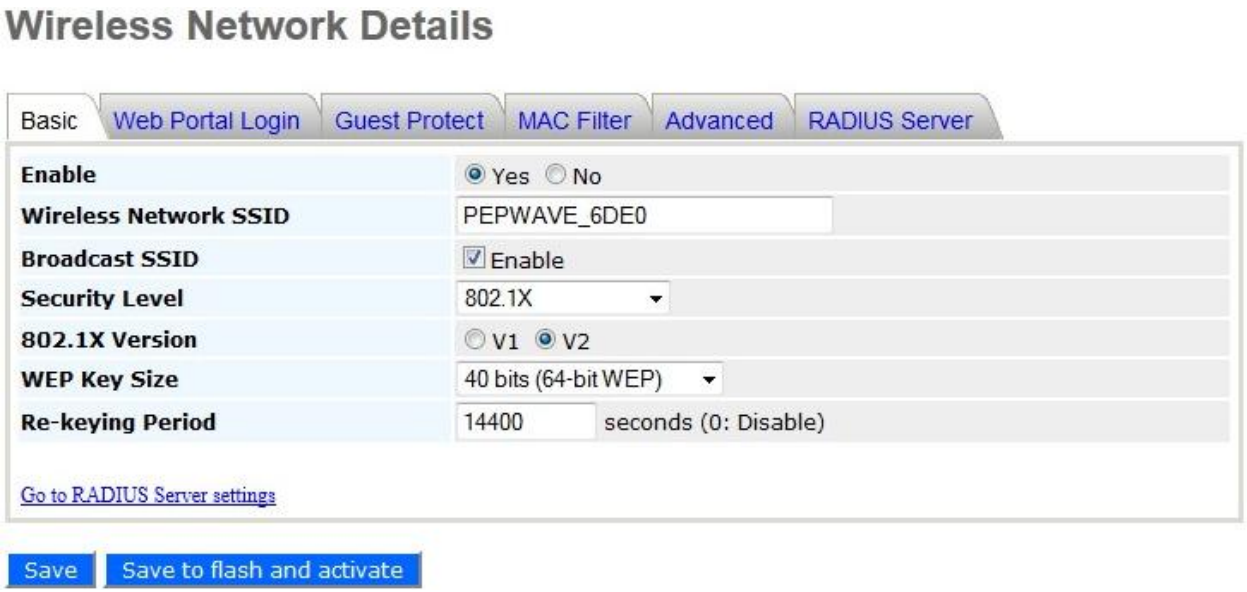
7.3.1.2 802.1X Parameters

The configuration of 802.1X parameters enables RADIUS-based 802.1X authentication with a dynamic WEP key.



802.1x Parameters	
802.1X Version	Choose **v1** or **v2** of the 802.1x EAPOL. When **v1** is selected, both v1 and v2 clients can associate with the access point. When **v2** is selected, only v2 clients can associate with the access point. Most modern wireless clients support v2. For stations that do not support v2, select **v1**. Default is **v2**.
WEP Key Size	Choose **40 bits** or **104 bits**.
Re-keying Period	Length of time throughout which the broadcast key remains valid. When the re-keying period expires, the broadcast key is no longer valid, and broadcast key renewal is required. Default is **14400** seconds (four hours). **0** disables re-keying.

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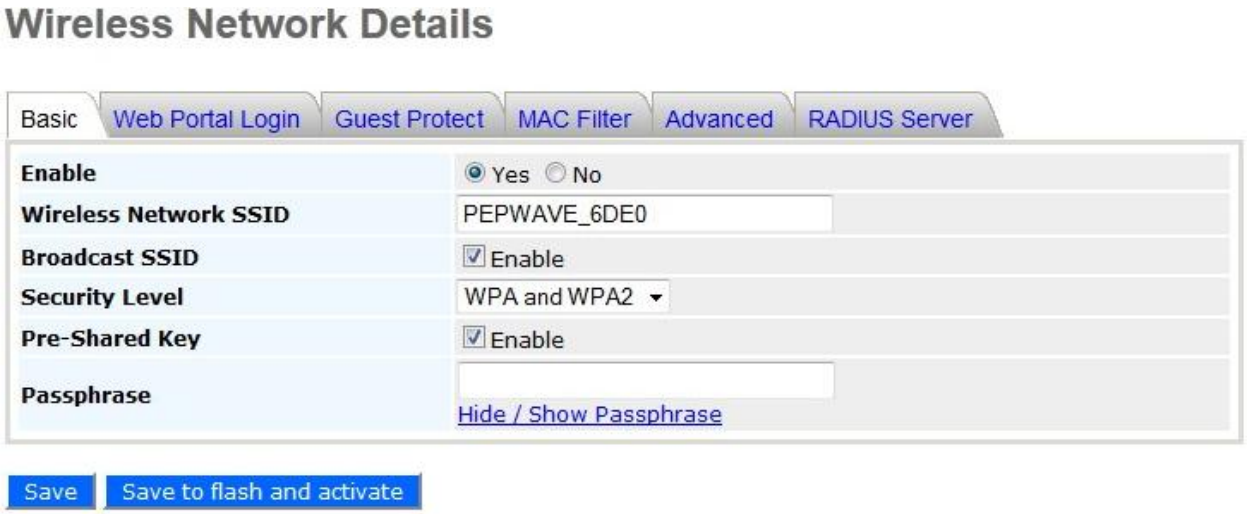
7.3.1.3 WPA parameters

The configuration of WPA parameters enables **WPA-TKIP**, **WPA2-AES:CCMP,** and **WPA-TKIP and WPA2-AES:CCMP**. To enable WPA and WPA-PSK, configure **WPA-TKIP**. To enable WPA2 and WPA2-PSK, configure **WPA2-AES**. When **WPA** or **WPA2** is configured, RADIUS-based 802.1x authentication with TKIP encryption method is enabled. When using this configuration, **Pre-Shared Key** should be **disabled**.

The security level of this method is known to be very high.



When **WPA-PSK** or **WPA2-PSK** is configured, a **Pre-Shared Key** or **Passphrase** is used for data encryption and authentication. When using this configuration, **Pre-Shared Key** should be **enabled**. Key length must be from 8 to 63 characters.

The security level of this method is known to be high.

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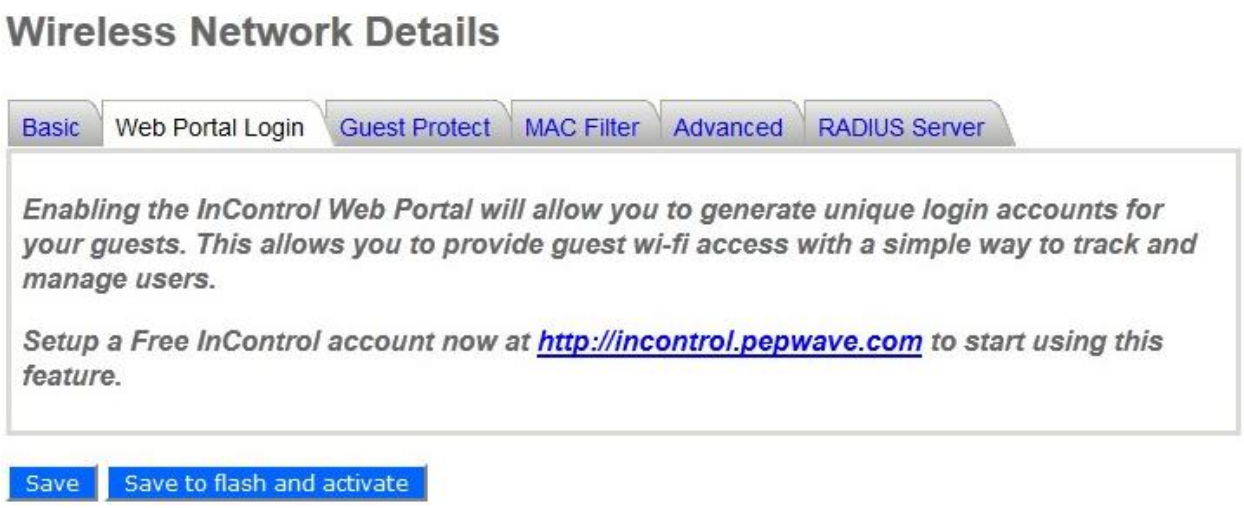
7.3.2 Web Portal Login

Once your Pepwave access point is registered with Pepwave InControl, you can apply


Wireless Network Details
Basic
Web Portal Login
Guest Protect
MAC Filter
Advanced
RADIUS Server
Enabling the InControl Web Portal will allow you to generate unique login accounts for your guests. This allows you to provide guest wi-fi access with a simple way to track and manage users.
Setup a Free InControl account now at http://incontrol.pepwave.com to start using this feature.
Save
Save to flash and activate

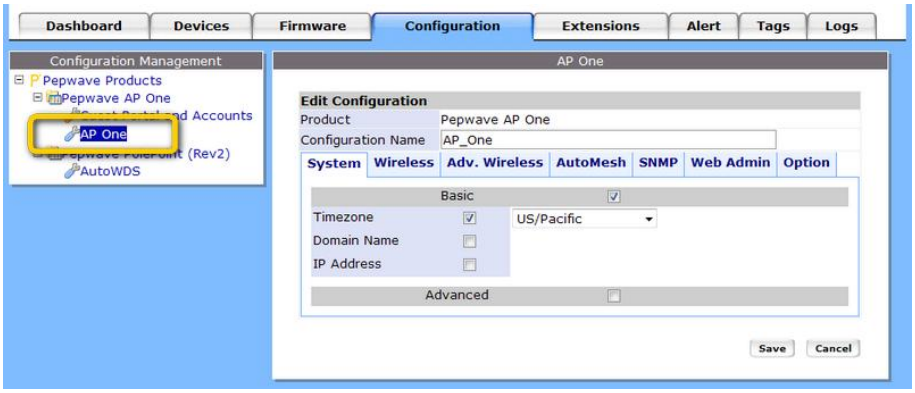
configurations, update firmware, and monitor network activity remotely using this centralized management system. For details, see http://www.pepwave.com/products/incontrol/.

7.3.2.1 Tip: How to Set Up a Pepwave AP Guest Portal in InControl

To set up a Guest Portal, (1) enable the guest portal function and (2) create guest accounts and set up a portal page.

Step One: Enable the Guest Portal

1. Log into InControl with your username and password. <https://incontrol.pepwave.com/>
2. Click the **Configuration** tab, then locate the desired configuration profile.



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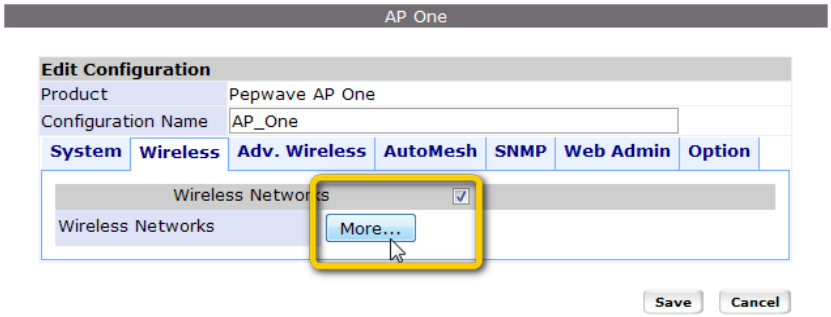
3. To find your wireless network, click the **Wireless** tab. Next, check **Wireless Networks**, then click **More…**.



4. Click the name of the SSID you have set up. Note: If you have not added a wireless network, click **New wireless network...** to create one.
5. On the **Edit a wireless network** page, click the **Web Portal Login** tab. Click **Enable** to enable Web portal logins. Click **OK** to continue.
6. Click **Save** to save your changes.
7. Click the **Web Admin** tag and setup the web access as follows:

   Web Access Protocol: **HTTPS**
   Management Port: **443**
   HTTP to HTTPS Redirection: **Enable**

8. Click **Save** to save your settings.

Step Two: Create Guest Accounts and Set Up a Portal Page

9. Go to **Guest Portal and Accounts** by clicking on the link on the left.
10. You can generate more than one account at one time. Change the parameters in **No. of accounts to be generated, Username prefix**, **Sequence number suffix**, and **Time Quota**. Default time limit is set to 24 hours. You can change the time limit.
11. Click **Generate**.
12. You should now have some guest accounts generated as shown **Unused Guest Accounts**. You can download account information in CSV format by clicking **All**, **Generated today**, or **Not generated today**.
13. A standard portal page will be generated automatically after guest accounts are generated (http://guest.pepwave.com). You can customize the portal page by clicking on the **Portal Page Customization** tab, where you can upload your logo image and enter a message for guests. Preview your portal page, then publish it.

Your guest accounts and portal page are now ready for use.

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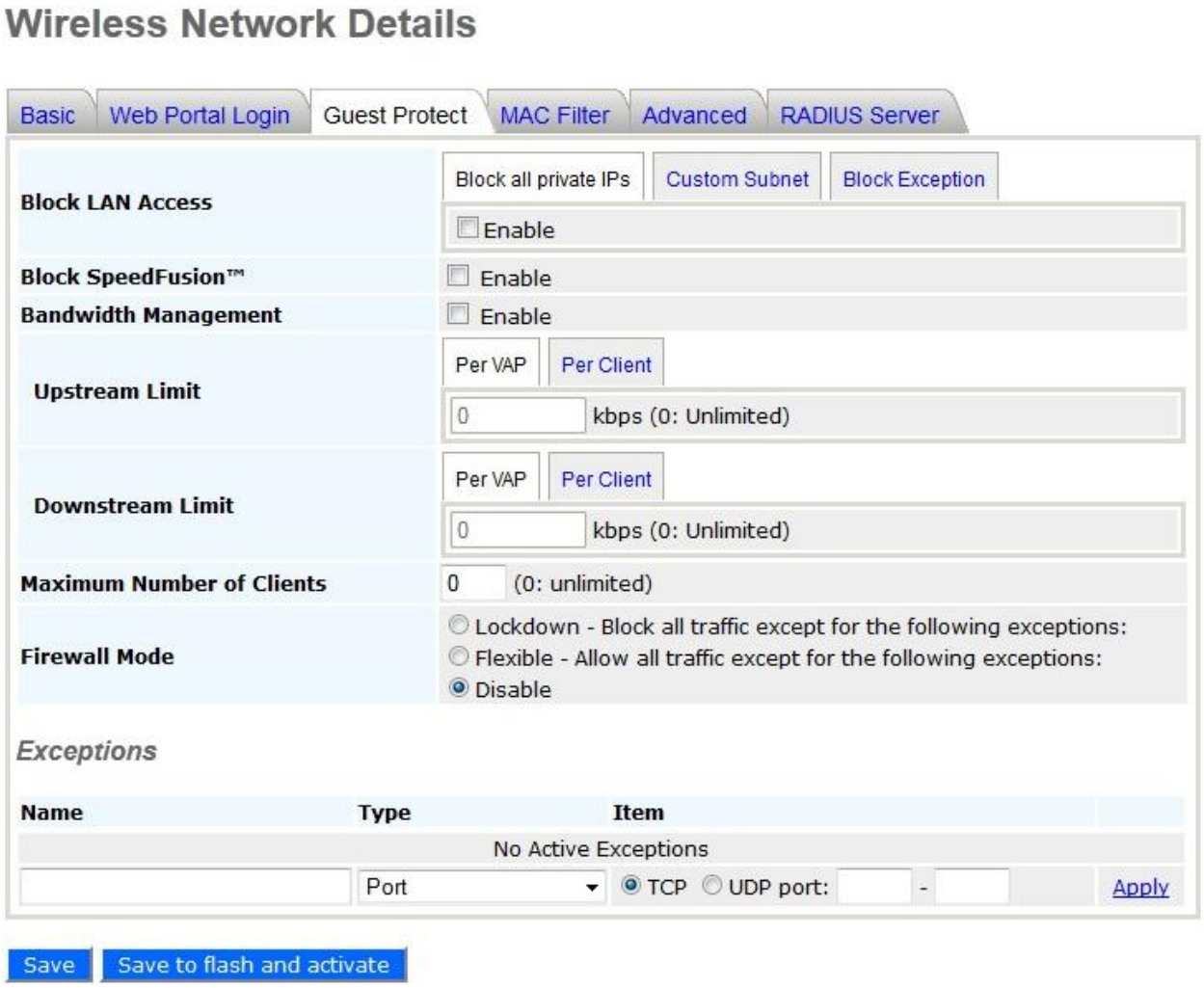
7.3.3 Guest Protect



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Wireless Network Details - Guest Protect	
	Enables settings to **Block all private IPs** / **Custom Subnet / Block Exception**. If you have selected **Block all private IPs** or **Custom Subnet**, these IPs / subnets will be blocked no matter what **Firewall Mode** is selected. When **Block Exception** is selected, IPs entered will be excluded from the blocking list.

Block LAN Access	• **Private IP** – Blocks common private IPs:
	  ○ 192.168.0.0 – 192.168.255.255
	  ○ 172.16.0.0 – 172.31.255.255
	  ○ 10.0.0.0 – 10.255.255.255
	• **Custom Subnet** – Blocks user-specified IP subnets.
	• **Block Exception** – Blocks all IPs except those specified.

Block SpeedFusion™	Block SpeedFusion™ traffic.
Bandwidth Management	Enables settings to control upstream and downstream limits. You can control bandwidth usage **Per VAP** or **Per Client**.
Upstream Limit	Upstream bandwidth limit in kbps. Default is **0: Unlimited**.
Downstream Limit	Downstream bandwidth limit in kbps. Default is **0: Unlimited**.
Maximum Number of Clients	Maximum number of clients that can be simultaneously connected to your Pepwave access point. Default is **0: unlimited**.
Firewall Mode	Enables one of three firewall modes: **Lockdown**, **Flexible**, and **Disable**. **Lockdown** – Block all traffic except pre-defined exceptions. **Flexible** – Allow all traffic except pre-defined exceptions. **Disable** – Firewall mode is disabled. (Default)
Exceptions	Specifies exceptions when **Lockdown** or **Flexible Firewall Mode** is selected. Exceptions can be added by type, including **Port**, **Domain**, **IP Address**, **MAC Address**, and **Application/Service.** Click **Apply** to save changes and make them active.

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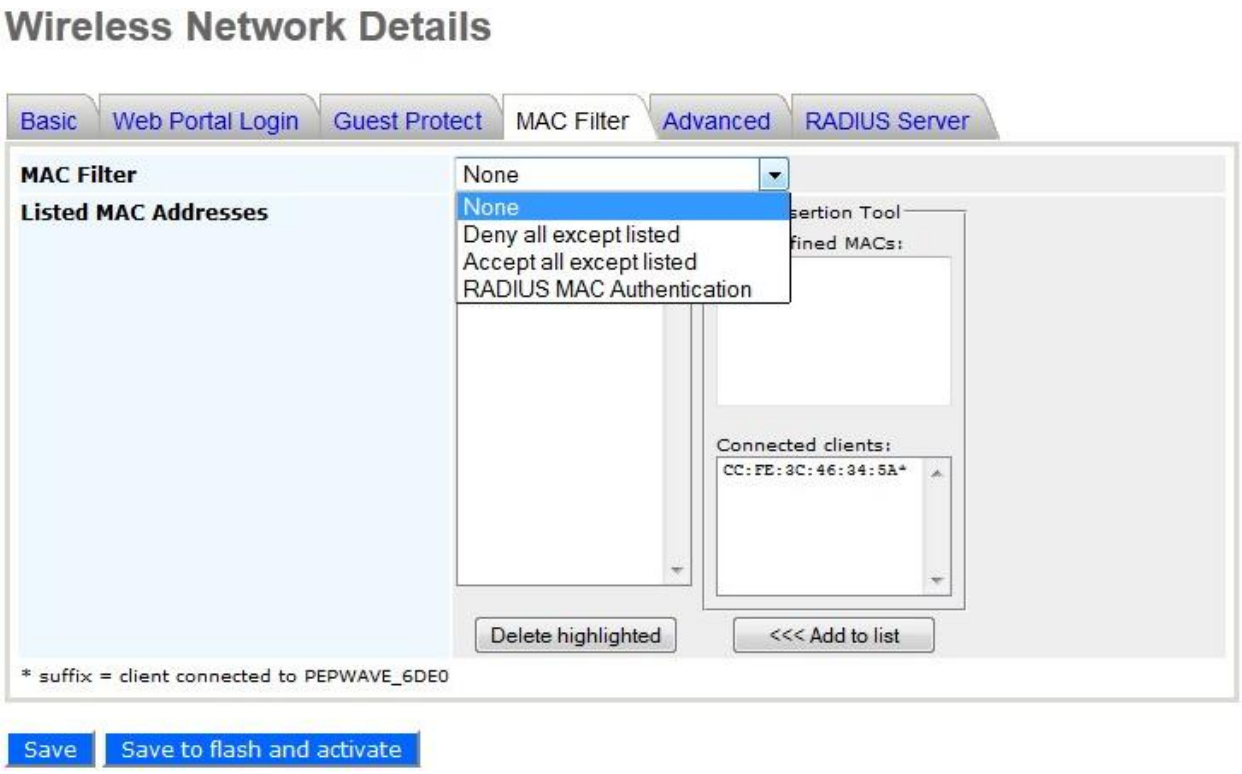
7.3.4 MAC Filter

These settings allow your administrator to control access using Mac address filtering. Choose from **None, Deny all except listed, Accept all except listed**, and **RADIUS MAC Authentication**. To delete MAC addresses from the list, select them, then click **Delete highlighted**. To add MAC addresses to the list, select them, then click **<<<Add to list**.



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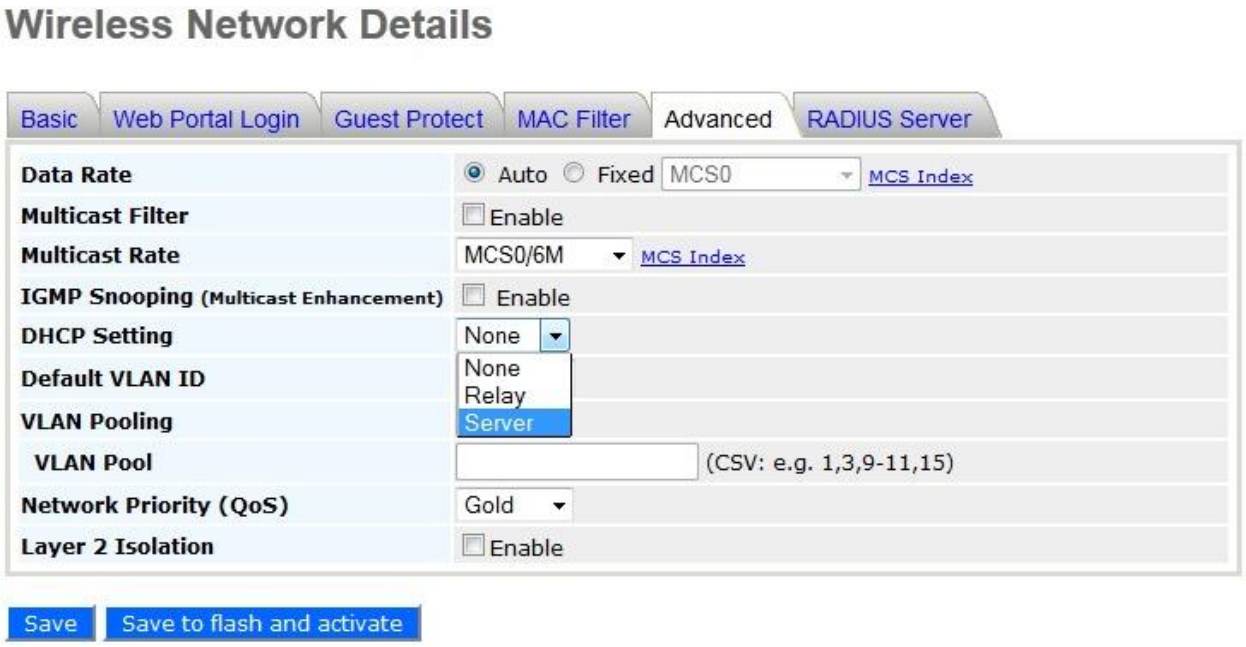
7.3.5 Advanced



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Wireless Network Details - Advanced	
Data Rate	Choose **Fixed** or **Auto. Fixed** forces all data packets to be transmitted using the selected transmit rate. **Auto** selects the best transmit rate, using the selected transmit rate as the minimum auto transmit rate. The rate options and values chosen here will be affected by selected **Protocol** and **Channel Bonding**.
Multicast Filter	Enables filtering multicast network traffic to the wireless SSID.
Multicast Rate	Transmit rate used for sending multicast network traffic. The rate value chosen here will be affected by selected **Protocol** and **Channel Bonding**.
IGMP Snooping (Multicast Enhancement)	Enables listening to Internet Group Management Protocol traffic between your Pepwave access point and hosts. Enabling this option ensures that hosts receive multicast traffic only from groups they have joined.
DHCP Setting	Choose **None**, **Relay**, or **Server**. Choosing **Relay** or **Server** will forward DHCP requests to a specified DHCP server and prevent broadcast messages from being propagated on the Ethernet segment. Upon selecting this option, the DHCP server IP address (or DHCP server settings) will be prompted.
Default VLAN ID	VLAN ID to be tagged on all outgoing packets generated from the virtual AP (i.e., packets that travel from the Wi-Fi segment through your Pepwave access point to Ethernet segment via the LAN port). If **802.1x** is enabled and a **per-user VLAN ID** is specified in **authentication reply from the Radius server**, then the value specified by **Default VLAN ID** will be overridden. Default value is **0**, which means that **tagging is disabled**, not that management sessions will be tagged with **0**.
VLAN Pooling	Enables VLAN pooling using the values specified in **VLAN Pool**.
Network Priority (QoS)	802.1p QoS value marked on all outgoing packets generated from the virtual AP (i.e., packets traveling from the Wi-Fi segment through your Pepwave access point to the Ethernet segment via the LAN port). Choose **Gold**, **Silver,** or **Bronze**.

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Layer 2 Isolation	**Layer 2** refers to the second layer in the ISO Open System Interconnect model. When this option is enabled, clients on the same VLAN, SSID, or subnet are not allowed to communicate directly via the Layer 2 Protocol(s). Traffic is passed to upper communication layer(s). With this option disabled, clients on the same VLAN communicate with each other directly. (Windows network resources browsing is possible.) Default is **disabled**.

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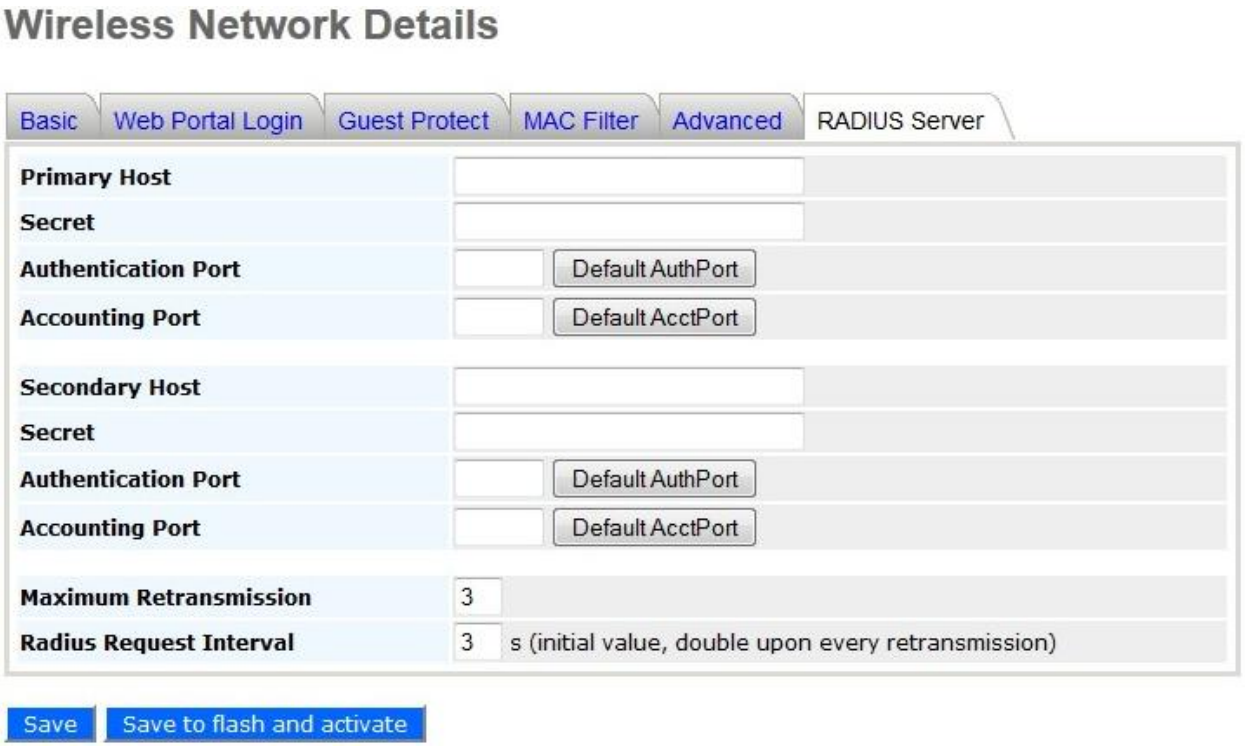
7.3.6 RADIUS Server



RADIUS Server Settings	
Primary Host	When 802.1x authentication is configured, the RADIUS server specified by this setting will be used for authentication and accounting.
Secret	Shared secret password for accessing the RADIUS server.
Authentication Port	UDP port number for the authentication port of the RADIUS server.
Accounting Port	UDP port number for the accounting port of the RADIUS server.
Secondary Host	This setting allows the RADIUS server to used for authentication and accounting in the event that the **Primary Host** is unavailable.
Maximum Retransmission	Maximum number of retries for RADIUS authentication. Default is **3**.
Radius Request Interval	Time interval, in seconds, between each RADIUS request attempt. Note that the request time interval doubles after every retransmission. Default is **3**.

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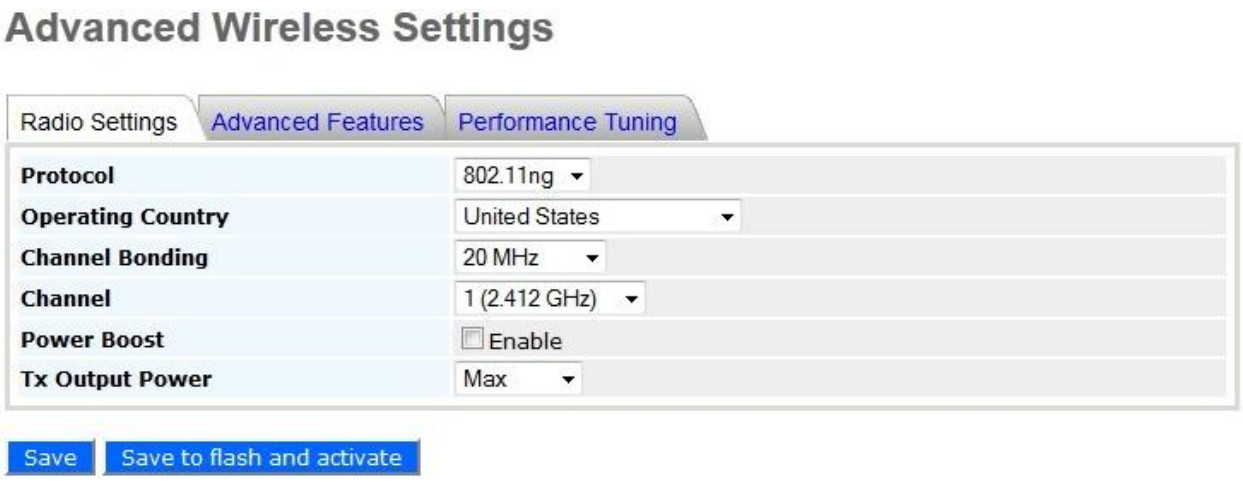
7.4 Advanced Wireless Settings

Advanced Wireless Settings provides more options to fine-tune system parameters for optimal performance.



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7.4.1 Radio Settings

Advanced Wireless Settings - Radio Settings	
Protocol	**802.11bgn**: Pepwave access point accepts 802.11b, 802.11g, and 802.11n client association requests. **802.11b/g**: Pepwave access point accepts both 802.11b and 802.11g client association requests. **802.11b Only**: Pepwave access point accepts only 802.11b client association requests. **802.11g Only**: Pepwave access point accepts only 802.11g client association requests. **802.11n Only**: Pepwave access point accepts only 802.11n client association requests.
Operating Country	**Note:** The country code selection is for non-US model only and is not available to all US model. Per FCC regulation, all WiFi product marketed in US must fixed to US operation channels only.
Channel Bonding	Only available when **Protocol** is set to **802.11bgn** or **802.11n Only**. Choose **20MHz**, **20/40MHz**, or **40MHz**.
Channel	802.11 channel. Choose from **1** to **11**. In North America and Europe, choose from **1** to **13**. (Channel **14** is only available in Japan when using the 802.11b protocol.) If **Auto** is set, the system scans channels based on the scheduled time and automatically chooses the most suitable channel.
Power Boost	Enables the power boost feature, which maximizes your access point's Wi-Fi capacity. Please enable only if local regulations permit.
Tx Output Power	Choose **Max**, **High**, **Medium**, or **Low** transmission output power.

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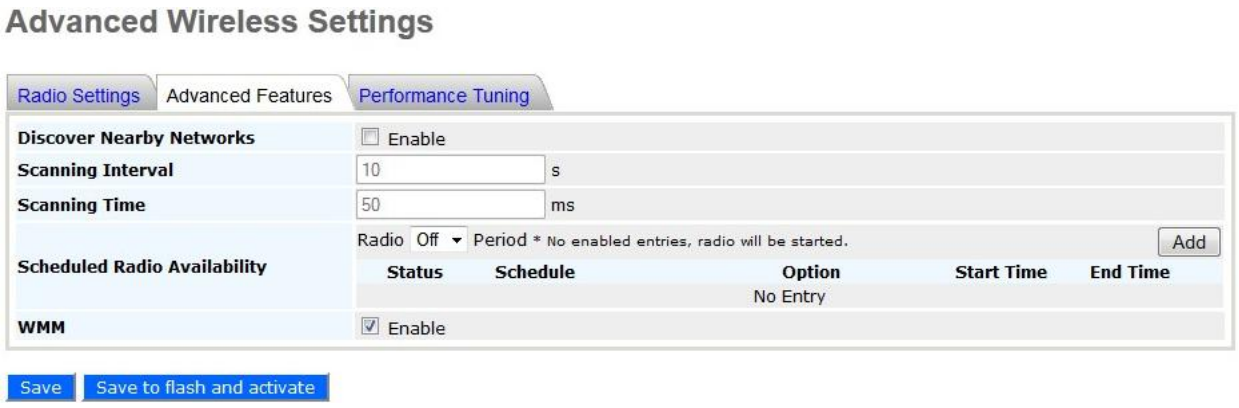
7.4.2 Advanced Features



Advanced Wireless Settings – Advanced Features	
Discover Nearby Networks	Enables your Pepwave access point to scan and discover nearby networks.
Scanning Interval	Specifies how often your access point goes to other channels to discover nearby networks.
Scanning Time	Specifies how long your access point stays on other channels to discover nearby networks.
Scheduled Radio Availability	Click **Add** to specify radio availability schedule options. If no options are specified, the radio defaults to **On**.
WMM	Enables Wi-Fi Multimedia (WMM), also known as Wireless Multimedia Extensions (WME), on your access point. Default is **enabled**.

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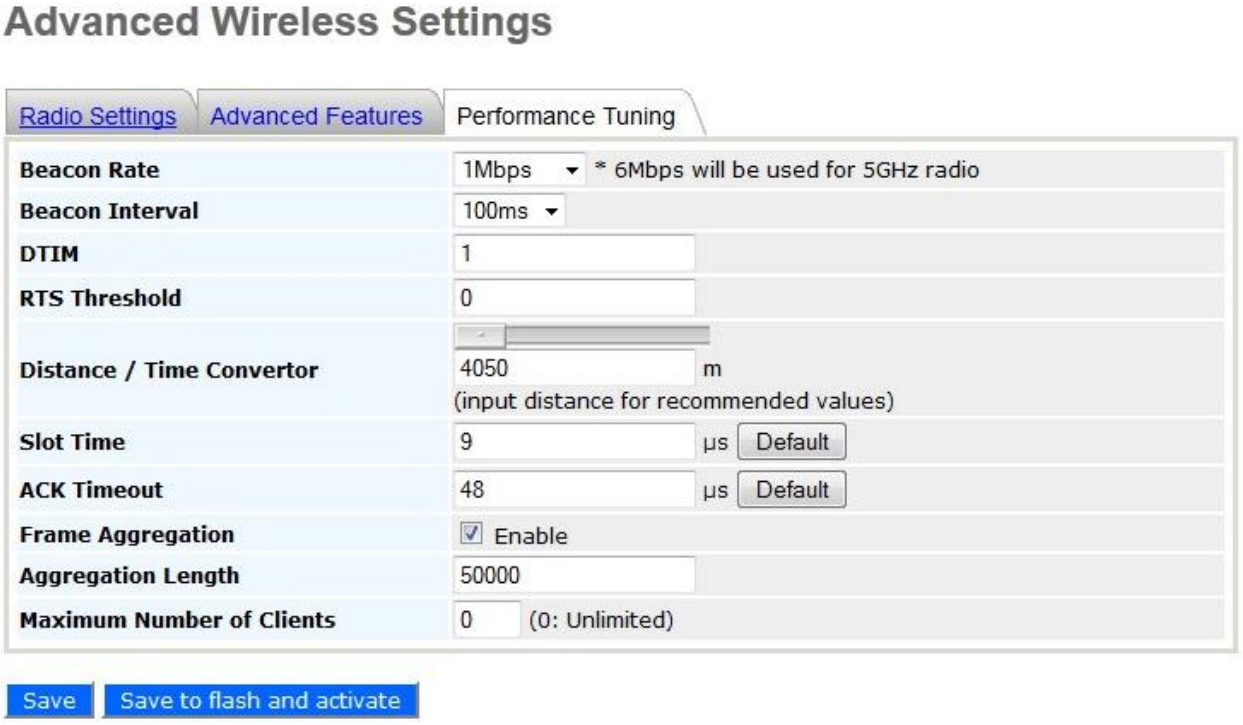
7.4.3 Performance Tuning



Advanced Wireless Settings – Performance Tuning	
Beacon Rate	Choose **1Mbps**, **2Mbps**, **5.5Mbps**, **6Mbps**, or **11Mbps** beacon rate. Default is **6Mbps** when using a 5Ghz radio.
Beacon Interval	Time between each beacon transmission: **100ms**, **250ms**, or **500ms**.
DTIM	Frequency for beacon to include Delivery Traffic Indication Message (DTIM) in milliseconds.
RTS Threshold	Minimum packet size needed to send an RTS using the RTS/CTS handshake. A setting of **0** disables this feature.
Distance / Time Convertor	Automatically adjusts **Slot Time** and **ACK Timeout** based on the distance entered in meters.
Slot Time	Provides option to modify unit wait time before it transmits. Default is **9µs**.
ACK Timeout	Provides the option to set the wait time to receive acknowledgement packet before doing retransmission. Default is **48µs**.
Frame Aggregation	Enables frame aggregation when **802.11bgn** or **802.11n Only** is selected.
Aggregation Length	Length of aggregation data frames. Available only when **Frame Aggregation** is enabled.
Maximum Number of Clients	Maximum number of connected clients. Default is **0: Unlimited**.

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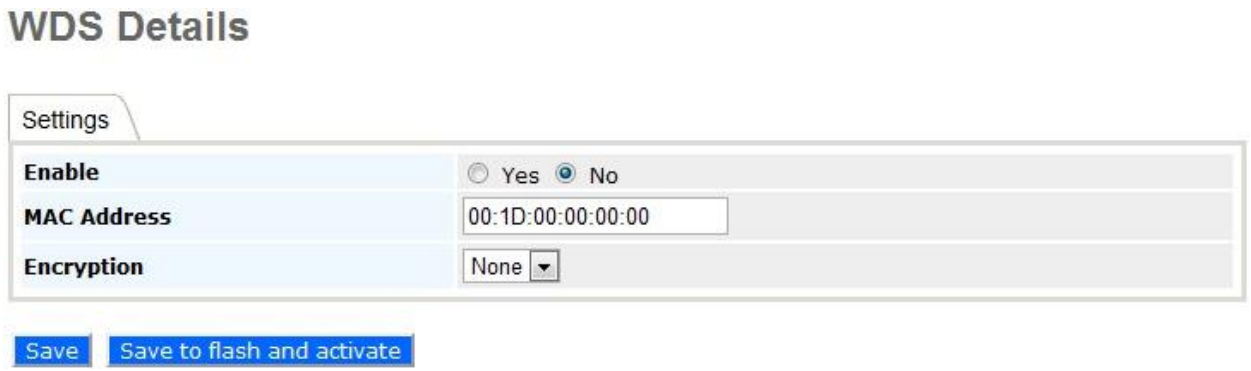
7.5 WDS

Wireless Distributed System, or WDS, provides a way to link APs when wired cabling is not preferable. WDS also extends wireless network coverage for wireless clients.

Click **Add** to add and configure a new WDS peer connection.



WDS Settings	
Enable	Enables WDS.
MAC Address	MAC address of the other AP with which to form a WDS link.
Encryption	Security policy used for WDS peer connections.

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7.6 SpeedFusion™

Select **SpeedFusion™**, located under **Configure** on the left, to begin configuring SpeedFusion connection parameters.

SpeedFusion™ - SpeedFusion™	
Local ID	Local ID to be recognized by peers.
Name	Name representing this profile. The name can be any combination of alphanumeric characters (0-9, A-Z, a-z), underscore (_), dash (-), and/or non-leading/trailing spaces ( ).
Peer Serial Number	Remote peer serial number. Note that your Pepwave access point will establish a VPN connection with a remote peer identified with a serial number.
Peer Address	IP address of the remote peer.
Status	Peer connection status.

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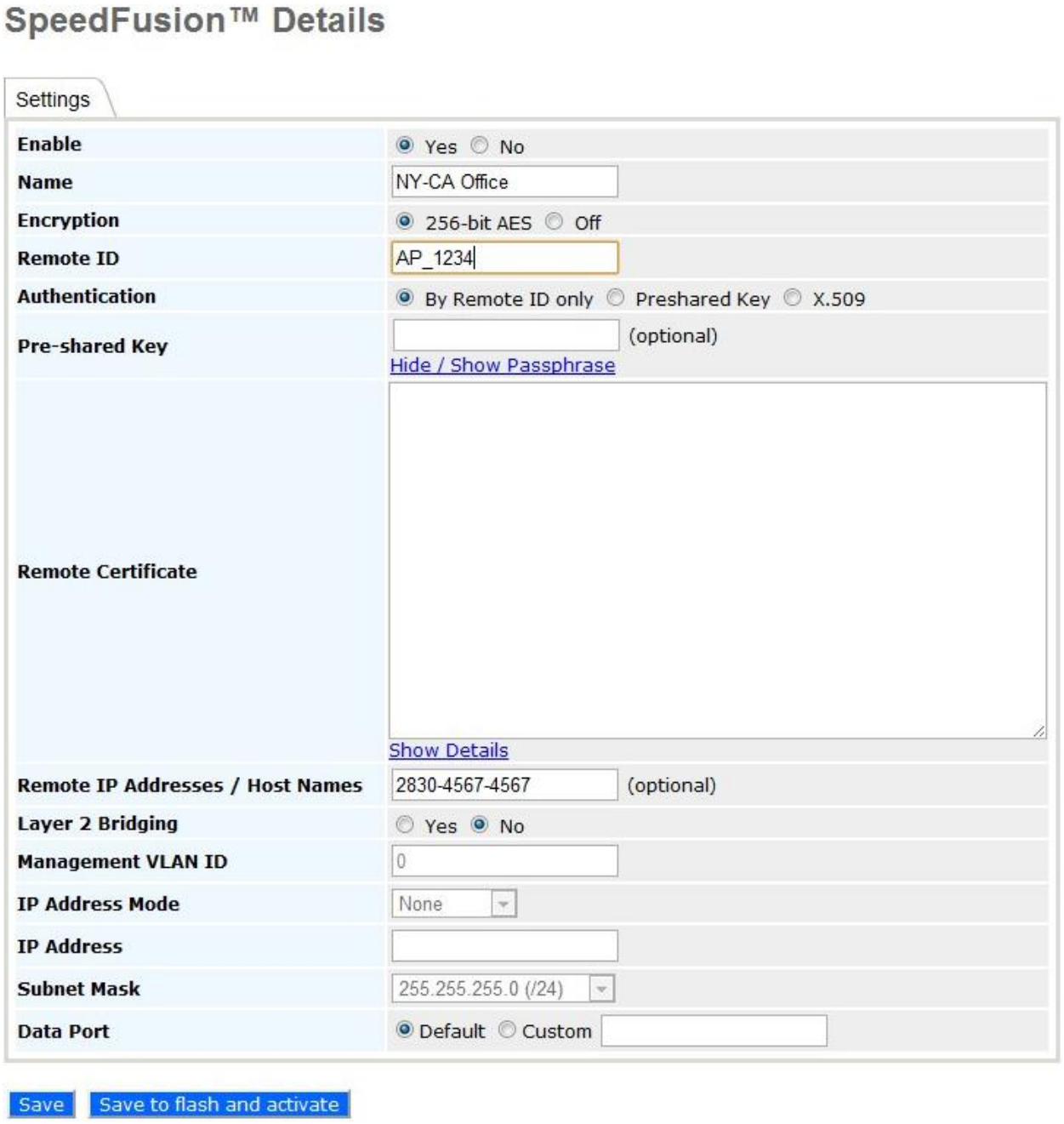
7.6.1 SpeedFusion™ Settings



Click **Add** to add a new SpeedFusion connection.

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SpeedFusion™ - SpeedFusion™ Settings	
Enable	Select **Yes** to enable this SpeedFusion profile.
Name	Name representing this profile. The name can be any combination of alphanumeric characters (0-9, A-Z, a-z), underscore (_), dash (-), and/or non-leading/trailing spaces ( ).
Encryption	Select **256-bit AES** to enable encryption or select **Off** to disable it.
Remote ID	Name representing the remote peer. The VPN profile will established only if the remote unit's ID or serial number matches **Remote ID**. This ensures that connections are made only with authorized remote units. If a remote unit is later replaced, **Remote ID** must be updated to match the unit's ID or serial number.
Authentication	Peer authentication method. Choose from **By Remote ID only** or **Preshared key**.
Pre-shared Key	Optional field which defines the pre-shared key used for this particular VPN connection. The VPN connection's session key will be further protected by the factor of the pre-shared key. The connection will be up only if the pre-shared keys on each side match. When the peer is running firmware 5.0 or 5.1, this setting will be ignored.
Remote IP Addresses / Host Names	Enter Internet host names and/or the IP addresses of the remote unit in this field. You may enter only one of the remote unit's WAN IP addresses/host names here even if I the remote unit has multiple WAN connections. Note that IP addresses/host names must be separated by a space or a carriage return. When this field is filled, connection to the remote unit will be attempted. If this field is left blank, the corresponding field at the remote unit must be filled. When the state of any WAN connection changes, the WAN IP addresses will be exchanged.
Layer 2 Bridging	When this check box is unchecked, traffic between local and remote networks will be IP forwarded. To bridge the Ethernet network of an Ethernet port on a local and remote network, select this check box. When this check box is selected, the two networks will become a single LAN, and any broadcast (e.g., ARP requests) or multicast traffic (e.g., Bonjour) will be sent over the VPN.
Management VLAN ID	This field specifies the VLAN ID with which the VPN's traffic should be tagged before sending the traffic to the bridge port. If no VLAN tagging is needed, select **No VLAN**. To define a new VLAN ID, click **New...** and input the VLAN ID. VLAN IDs that are not referenced by any VPN profiles will be removed from the list automatically. Default is **No VLAN**.

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IP Address Mode	**IP Address Mode** options are **Automatic** and **Manual**. **Automatic**: The IP address of your access point is acquired from a DHCP server on the Ethernet segment. **Manual**: A user-specified IP address is used for your access point.
IP Address	User-specified IP address for use with **Manual IP Address Mode**, above.
Subnet Mask	Subnet mask used by your access point.
Data Port	This field specifies the outgoing UDP port number for transporting VPN data. If **Default** is selected, port 4500 will be used by default. Port 32015 will be used if the remote unit's firmware version is prior to 5.4 or the port 4500 is unavailable for use. If **Custom** is selected, you can input a custom outgoing port number between 1 and 65535.

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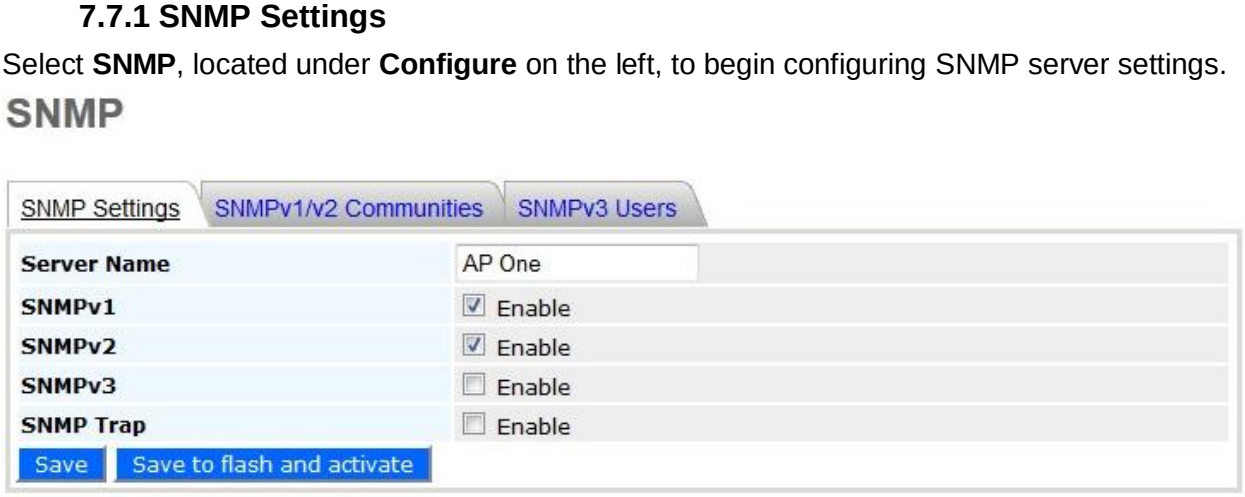
7.7 SNMP

7.7.1 SNMP Settings

Select **SNMP**, located under **Configure** on the left, to begin configuring SNMP server settings.



SNMP - SNMP Settings	
Server Name	Name identifying the SNMP server.
SNMPv1	Enable support for Version 1 of SNMP.
SNMPv2	Enable support for Version 2 of SNMP.
SNMPv3	Enable support for Version 3 of SNMP.
SNMP Trap	Enable SNMP trap messaging, which is initiated by a client and sent to your Pepwave access point.

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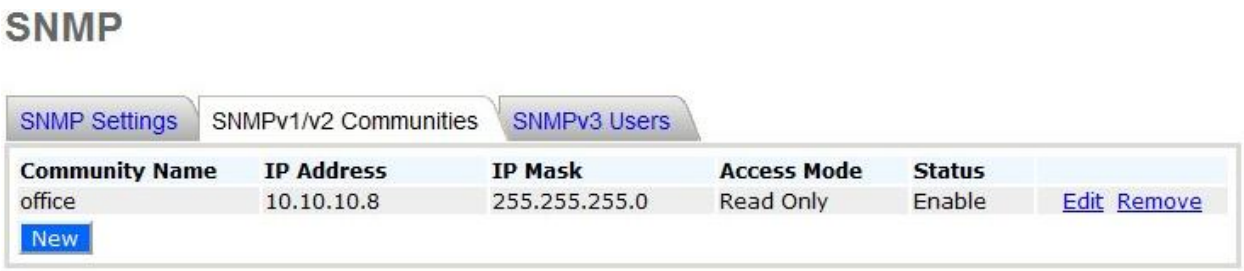
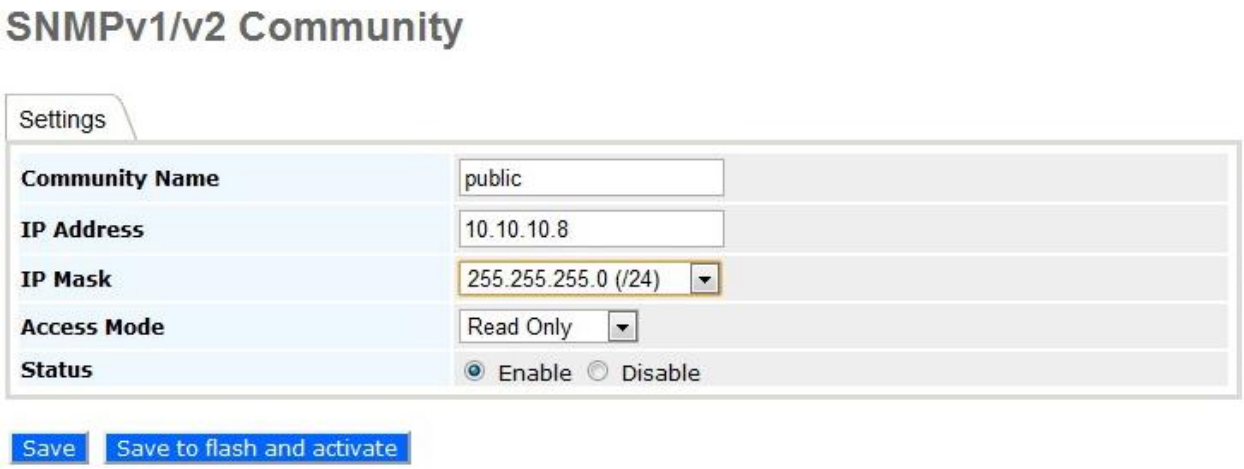


7.7.2 SNMPv1 / SNMPv2 Communities

Using SNMPv1/v2 communities, access rights can be controlled. Click **New** to add a new SNMP v1/v2 community, or click **Edit** to change the settings of an existing community. Click **Remove** to delete a community.



SNMPv1 / SNMPv2 Community - Settings	
Community Name	Password for getting or setting SNMP values.
IP Address and IP Mask	IP and subnet address that is allowed to access the SNMP server.
Access Mode	Choose **Read Only** or **Read & Write**.
Status	**Enable** or **Disable** this community.

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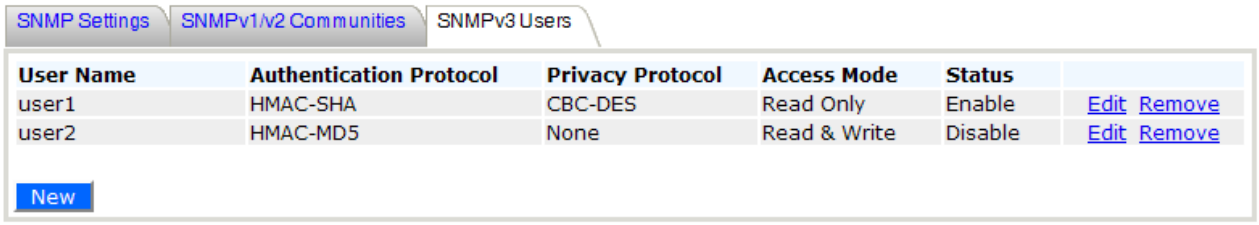
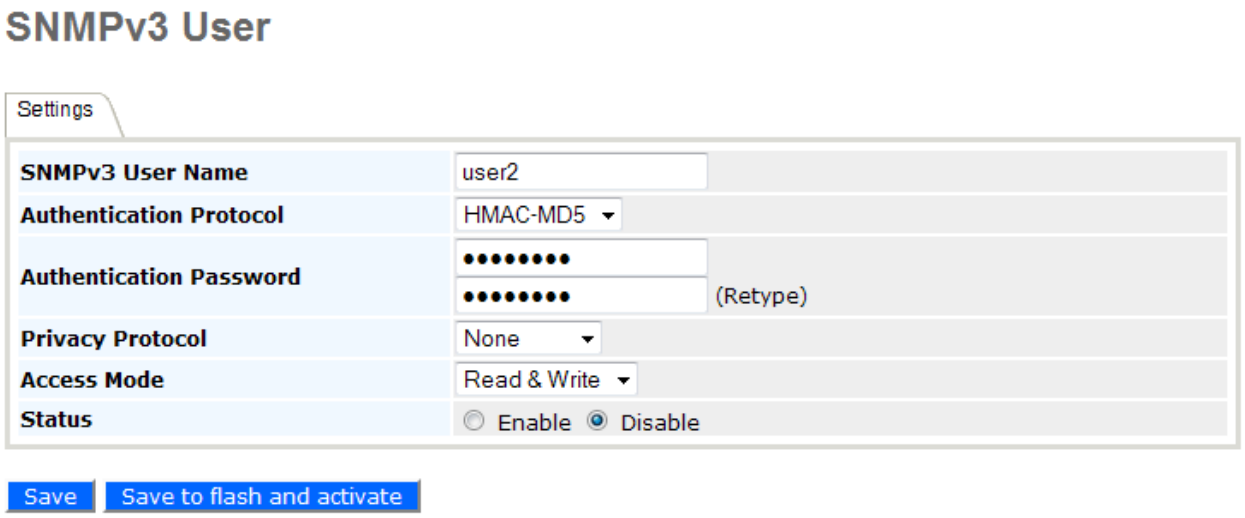
7.7.3 SNMPv3 Users



By adding SNMPv3 users, access rights can be controlled. Click **New** to add a new SNMPv3 user, or click **Edit** to change the settings of an existing user. Click **Remove** to delete an SNMPv3 user.



SNMPv3 User - Settings	
SNMPv3 User Name	User ID allowed to access the SNMP agent.
Authentication Protocol	Protocol for authenticating the user. Choose **HMAC-MD5** or **HMAC-SHA**.
Authentication Password	Users provided with a correct password will be granted the right to access the SNMP agent.
Privacy Protocol	Encryption method to be used in SNMPv3 communication. Choose **None** or **CBC-DES**.
Privacy Password	Shown only if **CBC-DES** is chosen as the **Privacy Protocol**. This is the key for decrypting encrypted data.
Access Mode	Grant **Read** or **Read & Write** access to this user.
Status	**Enable** or **Disable** this user.

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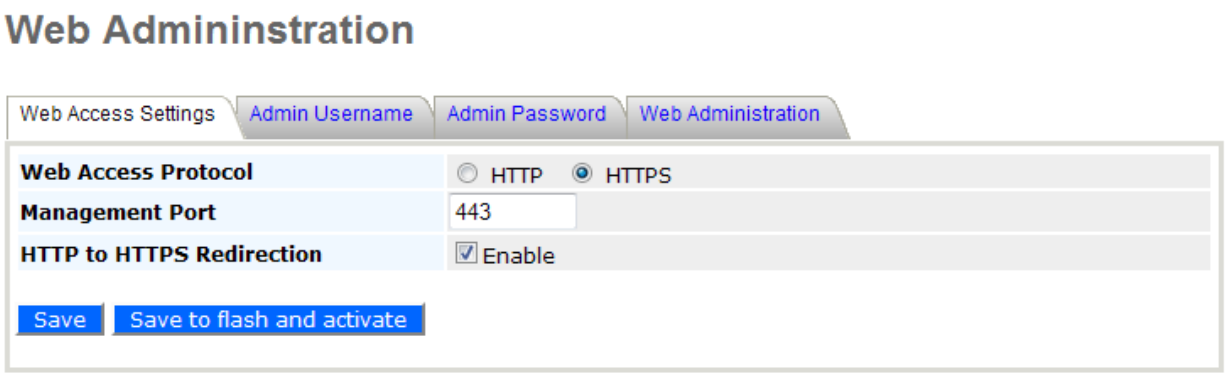
7.8 Web Administration

Select **Web Administration**, located under **Configure** on the left, to begin configuring the Web management interface.

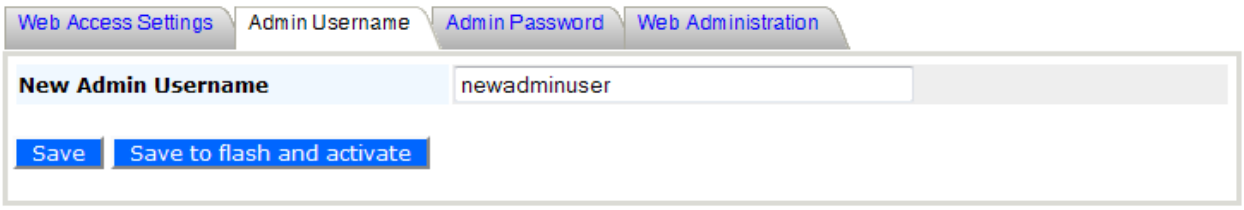
7.8.1 Web Access Settings

Web Access Settings configures the protocol and TCP port number of the web server. If **HTTPS** is enabled, the **HTTP to HTTPS Redirection** option will be provided.



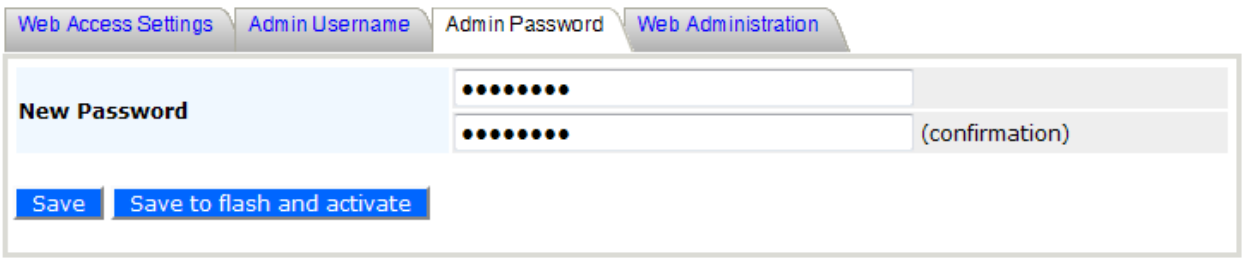
7.8.2 Admin Username

Admin Username configures the administrator username used to access the Web Admin Interface. To change the administrator username, enter a new username in **New Admin Username**.



7.8.3 Admin Password

Admin Password configures the administrator password used to access the Web Admin Interface. To change to the administrator password, enter the new password into **New Password** and **New Password (confirmation)**. Note that the two entries must match exactly.



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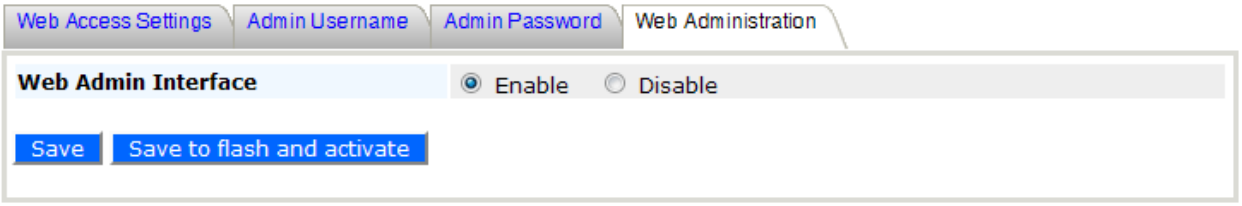
7.8.4 Web Administration

Disable Web Administration turns off access to Web Admin Interface. After being turned off, the Web Admin Interface can be re-enabled using SNMP.



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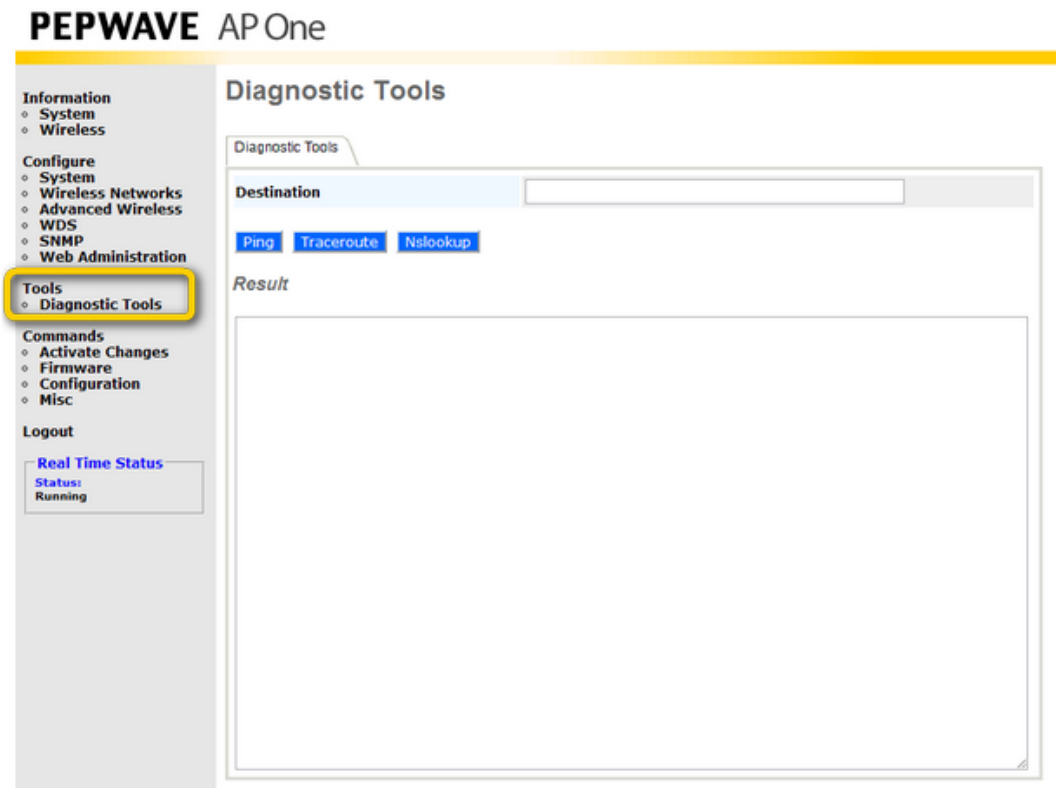
8 Tools - Diagnostic Tools

This selection provides three useful tools for diagnosing problems on your network: **Ping**, **Traceroute**, and **Nslookup**.



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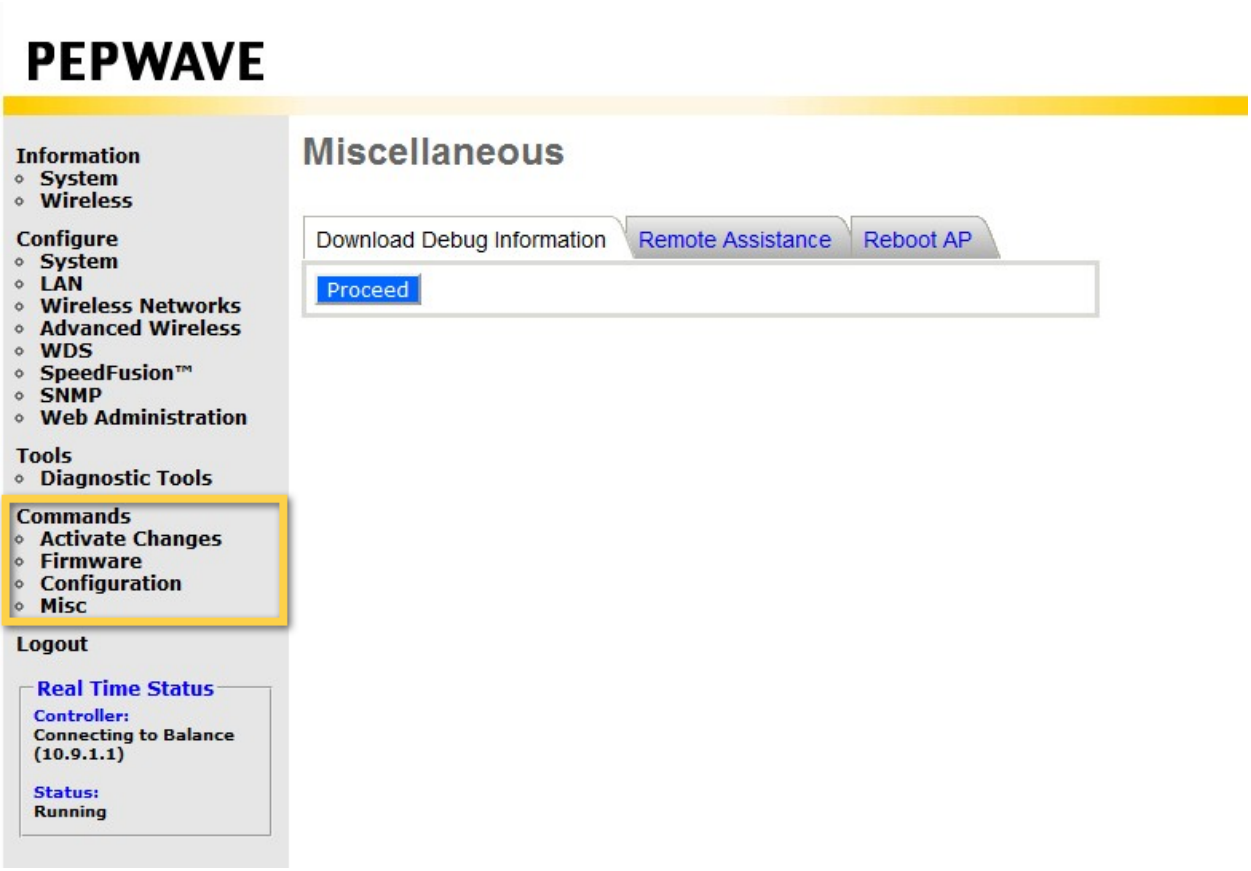
9 Commands

Commands, located on the left side of the Main Menu, puts a number of system control



commands at your fingertips.

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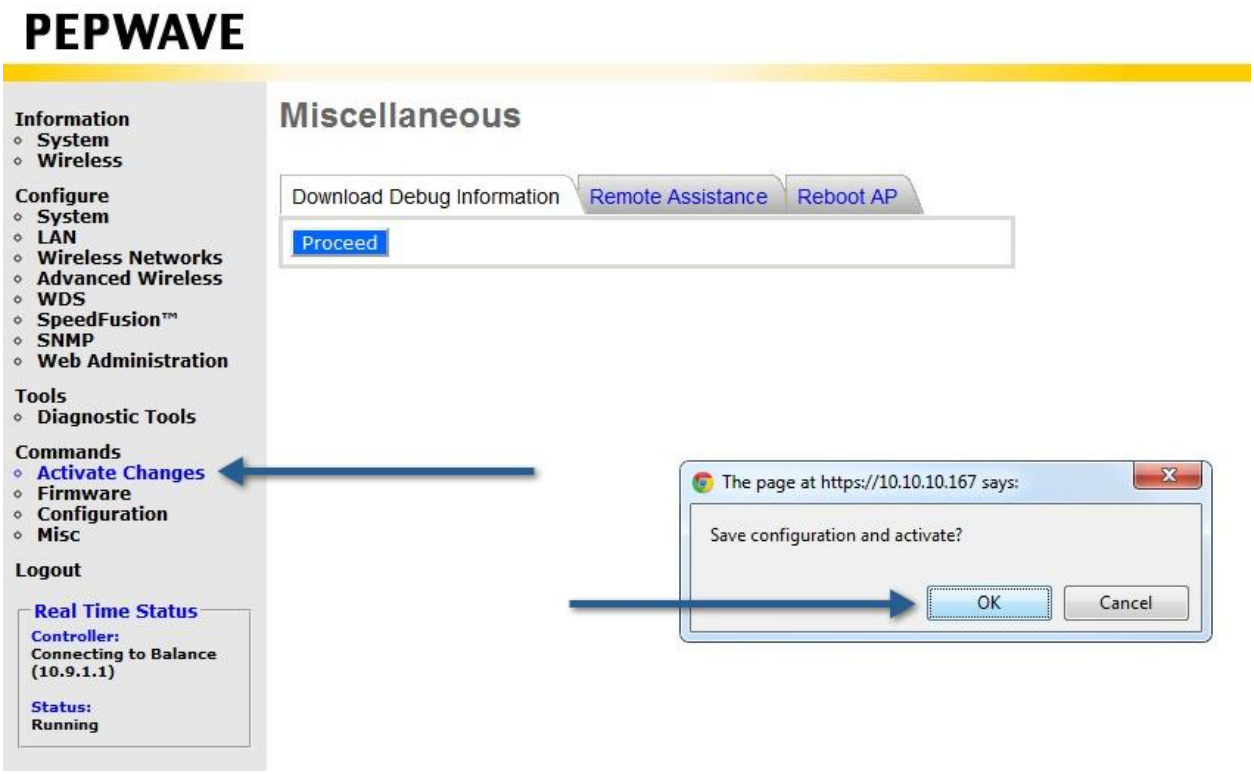
9.1 Activate Changes

Click **Activate Changes**, located under **Commands** on the left, and confirm to save your configuration and activate your Pepwave access point.



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9.2 Firmware

Click **Firmware**, located under **Commands** on the left, to check firmware versions, select a boot ROM, and update your Pepwave access point's firmware.

Commands – Upgrade Firmware	
Firmware Version	The firmware version loaded into the flash partitions.
Flash Status	The firmware status on the flash partitions.
Boot from	Indicates which flash partition boots up the system.
Firmware Upgrade Target	Indicates which flash partition will be upgraded with the next firmware upgrade.
Firmware Upgrade	Select **Online**, then click **Check** to look for firmware upgrade files online. Select **Manual** to choose a downloaded firmware update. In either case, a reboot is required after upgrading the firmware.

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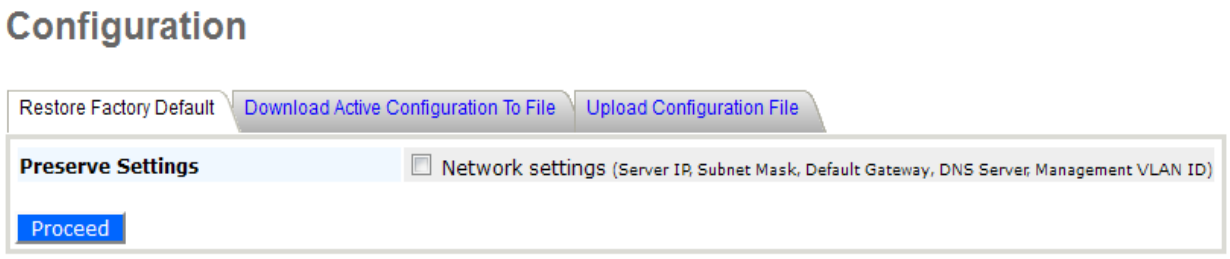
9.3 Configuration

Click **Configuration**, located under **Commands** on the left side of the main menu, to restore factory default settings, backup configurations, and restore backed up configurations.


Configuration
Restore Factory Default
Download Active Configuration To File
Upload Configuration File
Preserve Settings
Network settings (Server IP, Subnet Mask, Default Gateway, DNS Server, Management VLAN ID)
Proceed

Commands - Configuration	
Restore Factory Default	Used to restore your Pepwave access point's factory default settings. Preserve the network settings by checking **Preserve Settings**, then click **Proceed**. Settings, including **Server IP**, **Subnet Mask**, **Default Gateway**, **DNS Server**, and **Management VLAN ID** will be preserved.
Download Active Configuration To File	Used to download the active configuration for backup purposes.
Upload Configuration File	Used to upload the configuration from a backed up configuration file.

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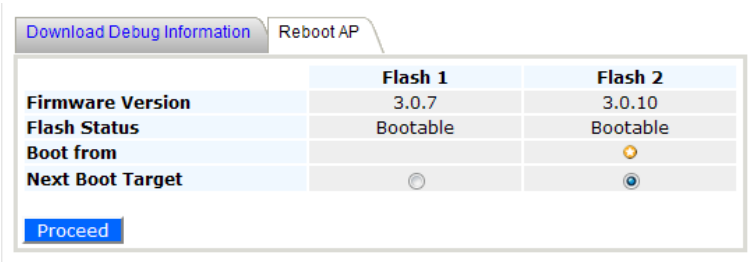
9.4 Misc

Commands - Misc	
Download Debug Information	Download debugging information from your Pepwave access point. To facilitate prompt resolution by Pepwave technical support in the event of technical issues, please send a debug file with your support request.
Remote Assistance	Get remote assistance with technical issues.
Reboot AP	Reboot your Pepwave access point using firmware saved in **Flash 1** or **Flash 2**.



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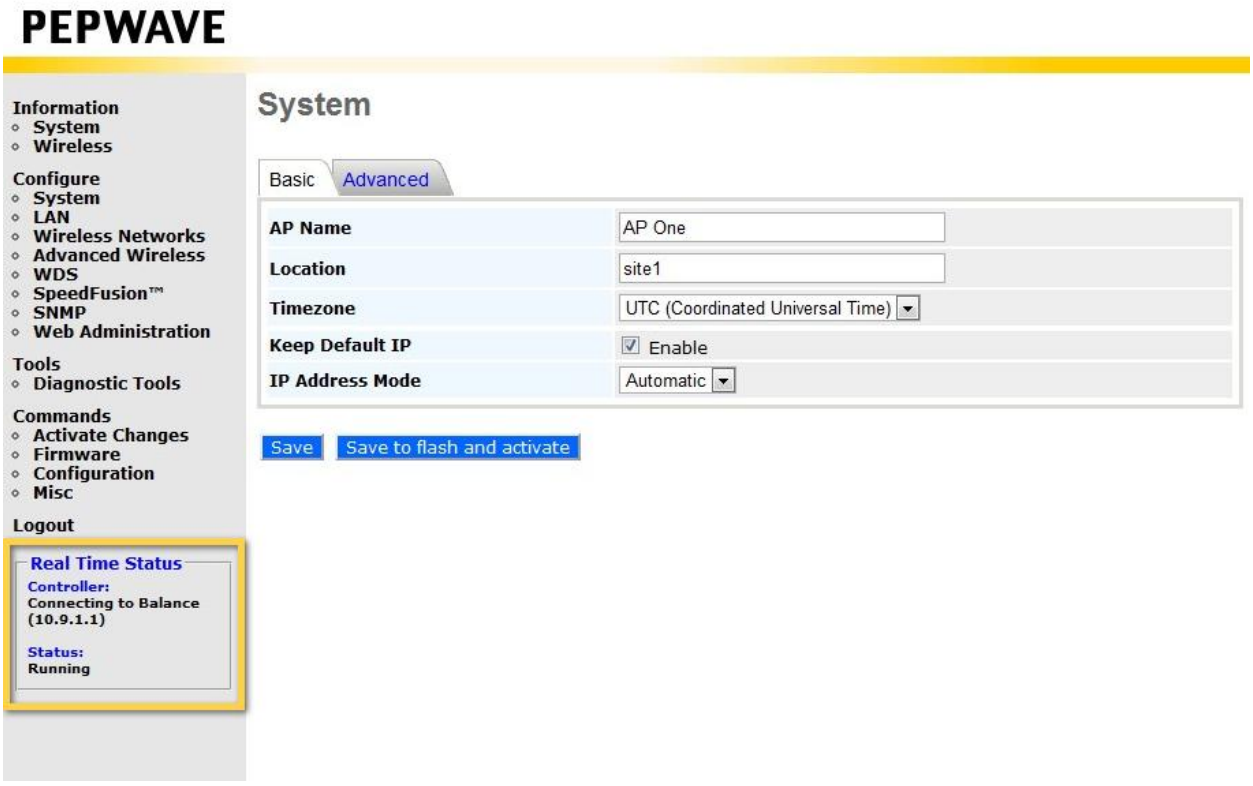
10 Real Time Status

Real Time Status displays the current status of your Pepwave acess point device. If your



access point is managed by a Peplink Balance, the default access of the Balance will be shown.

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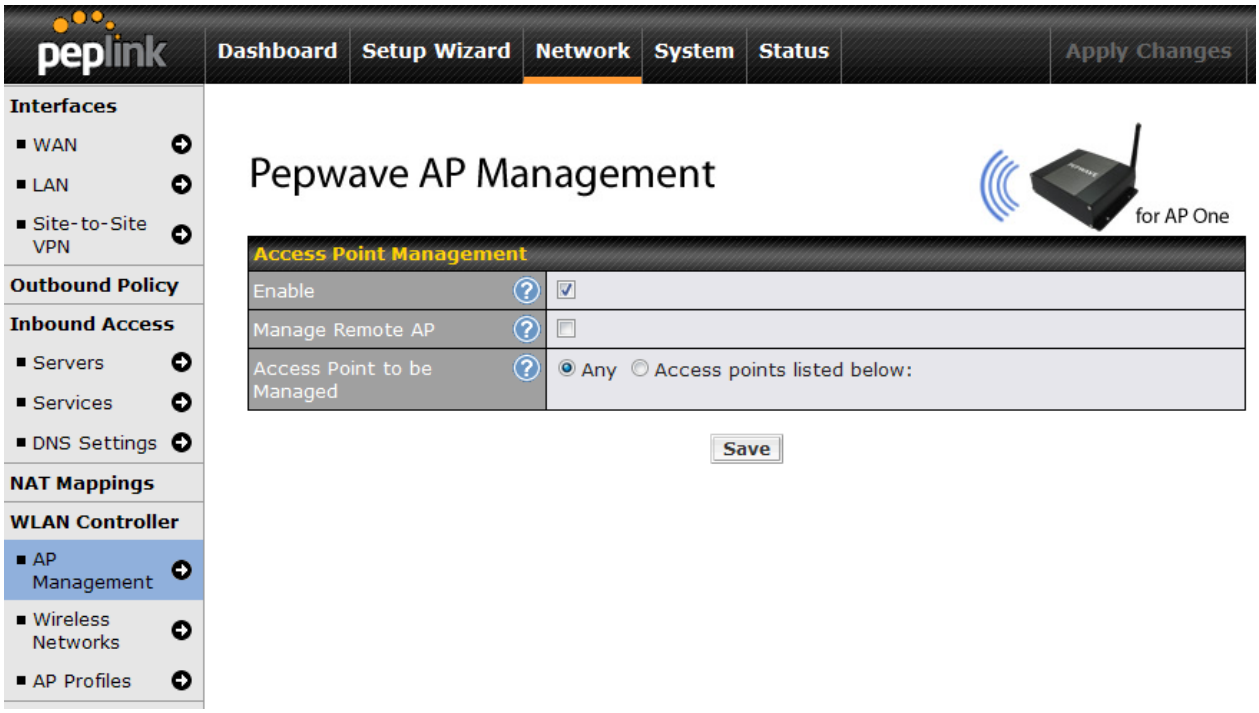
11 Peplink Balance AP Controller

Since firmware 3.0.6, Pepwave access points can be managed and configured using a Peplink Balance. For details, including the Captive Portal configuration or how Peplink Balance works as



an AP Controller, please refer to the Peplink website, FAQs, and Peplink Balance User Manual.

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12 Restoring Factory Defaults

The following procedure restores the settings of your Pepwave access point to factory defaults:

Power on the unit and wait for one minute.

Press and hold the reset button on the rear panel for at least five seconds, then release.

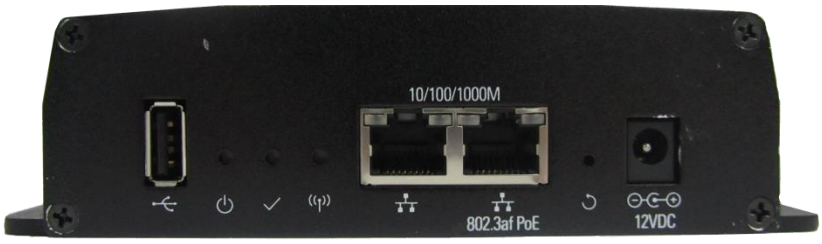
The unit will automatically reboot.

Wait for one minute or until the Status LED turns green, upon which the settings of the device will have been restored to the factory defaults.

By default, the unit will acquire an IP address from a DHCP server.

12.1 AP One

12.2 AP One 300M



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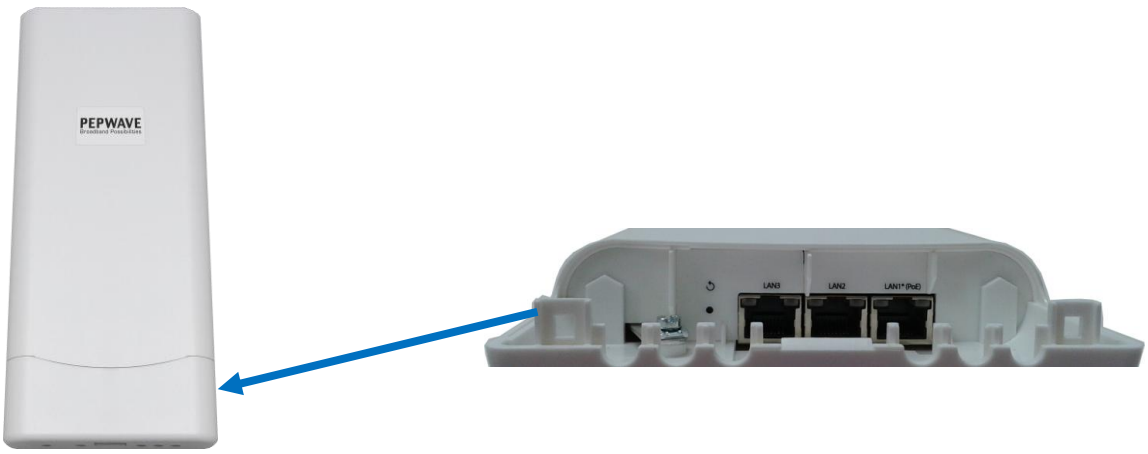
12.3 AP One Mini

12.4 AP One X

12.5 AP Pro X

12.6 Flex AP



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13 Appendix

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

1) Reorient or relocate the receiving antenna.

2) Increase the separation between the equipment and receiver.

3) Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

4) Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

IEEE 802.11b or 802.11g operation of this product in the U.S.A. is firmware-limited to channels 1 through 11.

IMPORTANT NOTE

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 31cm between the radiator & your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

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PEPWAVE

Broadband Possibilities

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